

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."—
(Sir Auckland Geddes, Minister of National Service.)



The Delayed Offensive.

IN all probability before these lines appear in print the renewed German offensive will have opened and the great battle for a decision in the West will have again been joined with even greater violence than ever. There is no question, however, about the blow having been delayed beyond the calculations of the enemy command. For some time it has been known to the Allied Staff that Ludendorff's preparations for what we believe must be the ultimate effort to force a favourable decision of the war have been practically complete, but the attack has hung fire mainly through the pertinacity and skill with which our aerial offensive has been conducted. It is true that there are reports to the effect that the delay has been partly due to an epidemic of influenza among the German troops, but it is impossible to say whether this has reached proportions which would account for the apparent unwillingness of the enemy to strike. On the other hand, we do know that his

preparations for the offensive have been seriously hampered by our aircraft, which have persistently, and with great success, struck at the vital points on his lines of communication, doing a vast amount of damage which has consumed valuable time in repairs before the ordinary routine of transport could be resumed. Further than that, certain of the German points of concentration have been so heavily attacked from the air that the enemy has been compelled to evacuate them. Bapaume and Peronne, in particular, have been so constantly and effectively bombarded that they have become untenable. At the same time the enemy's munition centres beyond the Rhine have been receiving constant attention at the hands of our raiding airmen, and it is fair to assume that their operations have also had a certain amount of effect on the enemy's plans.

While it would be too much to claim that these aerial operations are exercising a directly decisive influence on the course of the war, it is nevertheless certain that they are producing effects which may in the end help very materially to the victory of the Allies. We know that so far as the Germans are concerned time is the whole essence of the issues. We know—and the enemy realises it to the full—that unless they can take full advantage of their present numerical superiority and of the initiative which they hold at the moment before the American armies arrive in sufficient numbers to redress the balance against the Allies, their chances of victory are gone beyond hope. As the Americans are arriving in thousands every week it is quite clear that every day the offensive is delayed is in our favour and against the enemy. It may well be, therefore, that while they are so effectively bombarding behind the German lines, our air squadrons are literally winning the war for us. Apart from the magnificent work they are doing in this direction, the ascendancy our airmen have established over the enemy's air service makes the latter's observation of what is going on in rear of the Allied lines comparatively poor, while so active are our own scouts that nothing which happens by day can be hidden from them, and the German Command is compelled to carry out all its movements and concentrations of troops under cover of night. We are doing well in the air, beyond a doubt, as Sir Douglas Haig's message to G.O.C. Royal Air Force, France, emphasises; but we must still strain every nerve and resource we have to do even better. The losses both of pilots and machines are heavy,

though it is a pleasing reflection that they are far and away lighter than those of the enemy, and the word must be: Production, and yet more production in the workshops and factories of the homeland.

From a purely academic point of view the debate last week in the House of Lords on the subject of a "League of Nations," which is to enforce peace on the nations of the world—after we have settled the present war—was of considerable interest. So far as the principle is concerned, it is altogether admirable. The world has had enough, and more than enough of war, and if it were within the bounds of practicability to band the nations together in a league which could and would prevent any one or more of the more evilly disposed among the community from plunging the earth into another blood-bath such as it has been wallowing in for the past four years, then every one of us would agree without qualification to the principle and its application. But even before we begin to discuss whether or not it is a practical proposition, we must express a certain measure of doubt as to whether the moment is really opportune for the discussion of plans which appear, on the face of them, nearly approaching the Utopian. It may with considerable force be argued that we have not settled the present war yet. We cannot even now foresee its exact issues, and upon them very largely depends the future of the peace-enforcing League of Nations. Certainly, there can be only one end to the war—the defeat of Germany and her Allies—but we do not know when that will be consummated nor do we know the exact measure of defeat the Central Combine will really sustain. Until we know the conditions that are likely to obtain after the war, it seems to us that the scheme must remain an ideal rather than a settled possibility. For our own part, outside activities in regard to re-construction after the war, we had much rather see the whole of our energies devoted to the task of achieving victory, leaving the discussion of ideals until at least that victory is well in sight—and we should be wantonly foolish to pretend that it is visible in the offing yet.

Supposing, however, we had arrived at that stage in the war at which it had become possible to visualise results with something like certainty, and our statesmen and thinkers remained of the opinion that the future peace of the world is bound up in a "League of Nations." How, then, is that League to be constituted, and under what guarantees? Lord Curzon, in the course of the debate, sketched the machinery which would be at the disposal of the League in its work of enforcing peace. These measures he defined as: First, the institution of a court, or conference, or tribunal, to which all the signatory parties pledged themselves to refer their disputes before going to war. Secondly, the imposition of a moratorium for delay pending decision, during which no hostilities were to be permitted, and any Power commencing or continuing hostilities to be regarded as an offender. Thirdly, the existence of a sanction for enforcing the decrees of the supreme body. The form of the sanction suggested was the exercise of the economic boycott and the application in the last resort of force. As Lord Curzon himself pointed out, the initial difficulty to be encountered is that the suggested Conference must consist of all the Great Powers, including, as a matter of course, Germany. But—and here we get back to

the argument that discussion is premature—we have no assurance that the form of government which will exist in Germany after the war will be one that would subscribe to the ideal of the League. Assuming, as we have every right to assume, that Germany elected to stay out of the League, we should once again find ourselves confronted with a position in which the nations had resolved themselves into two powerful and antagonistic groups. Again we see that present discussion is premature.

Suppose, on the other hand, Germany and her Allies were willing to come in, we should then have to work out the ways and means for making the decisions of the Conference effective and binding on all—including respect for scraps of paper. Now, as the whole of the international and social system rests on an ultimate basis of force it becomes clear—as Lord Curzon's formula provides—that there must be force behind the Conference and its decisions. Who, then, is to be the policeman, and, more important still, who is to see that the policeman shall at all times and under all circumstances be so strong that his authority cannot be disputed? To ensure the latter, it seems to us that the first essential is the limitation of armaments, which can only be achieved by the parties to the League subscribing to a self-denying ordinance and keeping to its strict letter. In other words, armaments must be rationed, and that is frankly impossible to be carried out effectively. To enforce such a policy would mean that the Conference must have powers of inspection and control, which in its logical sequence means complete control of all sources of production, and that cannot conceivably be done.

Again, it is by any means certain that the powers held by the Conference would suffice to hold in check the aspirations of a Great Power like Germany which was bent on aggrandisement and believed in the possibility of securing its ambitions by the sword. We should be foolish to ignore the fact that Germany with open eyes faced all the consequences which could accrue in the future from the powers it is suggested the Conference should hold. She has incurred the economic boycott of two-thirds of the civilised world and has stood up to the armed force of a real "League of Nations" for nearly four years, and is not beaten yet. How nearly, in spite of it all, she has come to achieving her aims we know too well. It may not be beyond the wit of man to devise methods of settling international disputes without recourse to arms, but we cannot see the solution yet. Indeed, we are strongly of the opinion at the moment that to be too strong to be attacked with any hope of success will remain, when this war has passed into history, still the best guarantee of peace. We would that we could think otherwise—but all the Leagues in the world will not change human nature or human institutions.

Sir W. Weir
on
Aircraft
Design.

Sir William Weir, presiding on the occasion of the sixth Wilbur Wright lecture last week, announced, as mentioned in last week's "FLIGHT," that the King had been pleased to grant to the Aeronautical Society to be known in future as the Royal Aeronautical Society. We congratulate the Society most wholeheartedly on this well-deserved recognition of a mass of excellent work in furtherance of the development of the great movement with which its activities are associated.

In thanking Dr. Durand, who delivered the lecture,

Sir William went on to say that he desired to pay a tribute to the skill, ingenuity, and capacity of our aircraft designers. He said:—

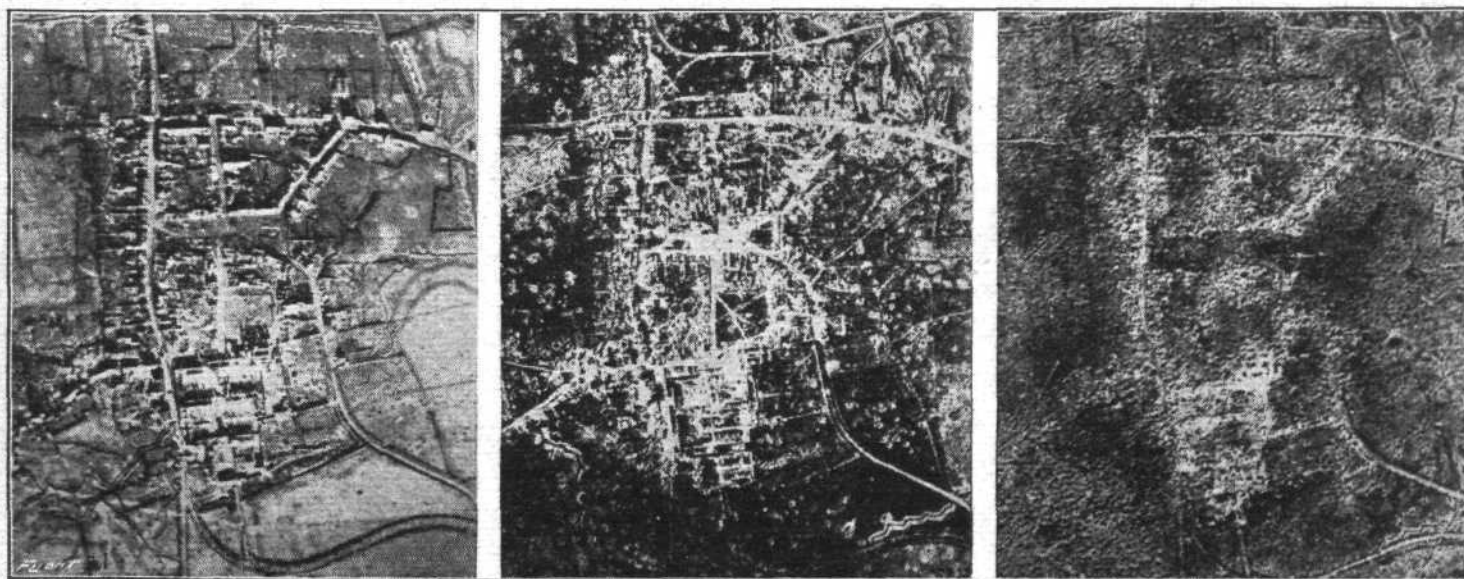
"Our policy of entrusting the design to the industry itself has been very successful, and the country owes a deep debt of gratitude to those firms who are devoting so much skill to the development of our designs, and I would refer more particularly to those pioneer firms who worked so many years without any immediate prospect of reward. I would say that, great as the progress has been during the past three years of war, that great advance is being accelerated, and designers and engineers of this country have played an outstanding part in this progress. Their combined achievement is one to be proud of. Our technical superiority over the enemy at the present time was equalled by the superiority of the human qualities of skill, enterprise, endurance, and pluck displayed by our pilots."

Speaking of the effort of the United States in the war, Sir William went on to say that the assistance given to the Allies by the American *personnel* had been very great, and the greatest confidence was entertained in the future of the American Air Force. With regard to material, we could now begin to speak with equal confidence. The tests which had been applied, both in this country and in France, to the latest American engine justified the prediction that it would prove a most valuable addition to the Allied resources, and the United States could go ahead and push its production with every confidence. The various methods of utilisation of aircraft in warfare were growing very rapidly—so rapidly that even with the help that America could give, the fullest demands which could be made to fulfil all the different functions of aircraft would never be met during the war. We should always require more aircraft and *personnel* than could possibly be supplied.

In the first place, Sir William's timely tribute to our own industry is as welcome as it is opportune. Moreover, coming from an air chief who is himself very intimately associated with engineering enterprise, it has a greater value than would be possessed by a similar tribute from a layman. If we may be permitted to put it that way, it has a truer ring—the more so because, apart from his expert knowledge of production, we know that it would not have been paid had he not sincerely believed it was due.

Secondly, with regard to the American effort, we on this side of the Atlantic have always, since the beginning of the war saw the formation of the famous Lafayette Squadron of American airmen, known that the American *personnel* was second to none in skill and gallantry. So far as concerns American material we are more than glad to know at first hand that the new engine—the Liberty—is justifying the great hopes that have been built upon it. So many conflicting stories of its qualities have reached us that, to be frank, we were not at all certain whether or not the admitted difficulties of producing an aero-motor on quantity-production lines had been surmounted. It is all the more credit to those who were responsible for the design of the Liberty engine that they have achieved the apparently impossible. That they have done what they set out to do we have the assurance of Sir William Weir, who speaks with complete knowledge of all the facts—and we may be sure that the facts are all in favour of the new machine, since the tests of which he spoke have been carried out in the light of all the accumulated knowledge and experience acquired during four years of aerial war.

There is one other point that occurs to us worthy of note, and that is Sir William's calculated statement that we shall, during the war, require more aircraft and *personnel* than can be supplied. We need not again labour the point, which we have so often made, that the war of the future will be fought in the air because the operations of aircraft will make the existence of armies on the ground practically impossible. Nor do we think Sir William had in mind that this condition will arise during the present war. We do not believe it will—unless the war is prolonged for several more years, which God forbid. As a matter of fact, we need not seek to discover what was in his mind. All we need do is to read the lesson as it falls, and that is, as we have said so many times, that every resource available must be strained to its utmost capacity in the production of more and more aircraft not only to supply the wastage of war but to establish and maintain a crushing aerial superiority over the Hun.



Official photo.

RECORDING FROM THE AIR.—In the above three photographs, taken by an R.A.F. pilot in France, is graphically seen the deadly effect of modern gunfire. All three were taken over one town; the first taken on February 29th, 1916, showing the town still very largely unscathed; the second on May 19th, 1917, showing the town badly pitted by shell-fire; the third, a month later, on June 18th, 1917, showing the town annihilated, and nothing but a mass of shell holes.

HONOURS.

Honours for the R.F.C.

THE following is the continuation of the awards of the Military Cross which were gazetted on June 22nd, the first part of which was given in our last issue:—

Sec. Lieut. WILLIAM HENRY GOODENOUGH MILNES, R. Warwickshire Regt. and R.F.C.—For conspicuous gallantry and devotion to duty. When on a bombing raid at a height of 800 ft., he was attacked by four enemy two-seater machines, and by skilful manœuvring enabled his observer to destroy one of them. In the course of five days' operations he dropped nearly a ton of bombs on enemy troops, camps and railways from a low altitude, and also used his machine-gun with good effect. He did excellent photographic work, and carried out several valuable long-distance reconnaissances. He always showed great courage and resource.

T. Sec. Lieut. CHARLES GEORGES DOUGLAS NAPIER, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. On one occasion during a low-flying bombing attack he descended to a height of 100 ft. and dropped four bombs amongst a body of enemy troops, causing heavy casualties and scattering the enemy in all directions. Later, whilst on offensive patrol, he observed an enemy two-seater and two scouts. He fired twenty rounds at the two-seater, with the result that it crashed, and then attacked one of the scouts, which turned over completely, and finally went down in a vertical nose dive. In all he has to his credit two enemy machines crashed and four driven down out of control. He has displayed the greatest judgment, determination and daring.

Lieut. (T. Capt.) DOUGLAS HAROLD OLIVER, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. He carried out a most successful reconnaissance, flying at a height of 500 ft. under heavy fire. Despite the fact that his machine had received a direct hit from a shell he succeeded in landing it at the aerodrome and brought back information of the greatest value. On the following day he carried out at a low altitude patrol under heavy machine-gun and rifle fire and obtained valuable information. His gallantry and determination have been most marked.

Lieut. (T. Capt.) LESLIE GEORGE PALING, Notts and Derby Regt., Spec. Res. and R.F.C.—For conspicuous gallantry and devotion to duty. While on contact patrol work he engaged a hostile battalion moving to the attack with bombs and machine gun fire, inflicting heavy casualties. On his return he was attacked by ten enemy scouts, all of which he succeeded in driving off after a hard fight, but was forced to land in front of our lines. Having destroyed his machine, he gave information as to the dispositions of the enemy and the nearest hostile field batteries. His exceptional courage, dash and capacity for hard work have proved invaluable.

T. Capt. WALTER HENRY PARK, R.F.C.—For conspicuous gallantry and devotion to duty. He undertook a long-distance reconnaissance under the most adverse conditions, and though several other machines were compelled to abandon the attempt he by his persistence completed his task and returned with valuable information. He is a patrol leader of the highest order, and his consistent gallantry and valuable services cannot be too highly praised.

T. Sec. Lieut. HENRY BASIL PETT, R.F.C.—For conspicuous gallantry and devotion to duty. He showed great courage and skill while engaged on reconnaissances and contact patrols during operations, flying at very low altitudes under heavy rifle and machine-gun fire. On many occasions he located the enemy's line by deliberately drawing their fire from the ground. On one occasion he made a reconnaissance of a whole corps front in very bad weather, which made it necessary for him to fly at a height of 350 ft. He was continuously under very heavy fire, but completed his reconnaissance and obtained valuable information.

T. Sec. Lieut. MICHAEL HENRY PICOT, R.F.C.—For conspicuous gallantry and devotion to duty. The information which he has brought back has been accurate and of the greatest value. In order to obtain such information he has been compelled to fly at very low altitudes, where he has been subjected to intense machine-gun and rifle fire. On one occasion, when the situation on the corps front was very obscure, he gained most valuable information by flying very low, but was compelled to return on account of his machine being riddled with bullets. He at once went up in another machine and completed his reconnaissance. His courage, persistence and good service have been most marked.

T. Sec. Lieut. GERALD PILDITCH, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. He engaged the enemy massed ready for an attack from a height of 300 ft., using up all his ammunition and scattering the enemy in all directions, inflicting very heavy casualties. Previously to this he had dived and fired on a hostile battery until he had

silenced it, and had also destroyed an enemy triplane and a two-seater machine. His work has been of the highest order, and he has shown the greatest courage and energy in attacking ground targets.

Lieut. (T. Capt.) THOMAS LAURENCE PURDOM, K.O.S.B. and R.F.C.—For conspicuous gallantry and devotion to duty. He attacked and shot down a hostile scout, and when himself attacked by a second scout, he shot the latter down out of control also. He has in addition to these destroyed four enemy machines within a month. He has shown the most exceptional gallantry and daring in engaging enemy aircraft.

T. Sec. Lieut. HAROLD BOLTON REDLER, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. He encountered four enemy two-seater machines, and attacking the lowest drove it to the ground with its engine damaged. Later, he attacked one of five enemy two-seater machines and drove it down out of control. He has destroyed in all three enemy machines, and driven three others down out of control. He continually attacked enemy troops and transport from a low altitude during operations, and showed splendid qualities of courage and determination throughout.

T. Sec. Lieut. JAMES HEATH REEVES, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty, in attacking enemy troops on the ground and in carrying out contact patrol work during operations. On one occasion he flew for two hours at a very low altitude, sometimes at only 50 ft., attacking enemy troops and transport. He was eventually severely wounded, but brought his machine back safely. He consistently showed great coolness and resource.

T. Sec. Lieut. HERBERT BRIAN RICHARDSON, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. While on patrol he attacked a formation of eight enemy aeroplanes, one of which he destroyed. On another occasion he engaged two enemy two-seater machines, and destroyed one of them. He has destroyed six enemy machines and driven down five others out of control, and has done valuable work in attacking enemy troops on the ground. He consistently displayed great courage and skill.

Lieut. JAMES TEMPLE RICHARDSON, Durham Light Infantry and R.F.C.—For conspicuous gallantry and devotion to duty. During one night he made three successive flights over the enemy's lines, dropping a large number of bombs on transport and attacking ground targets with machine-gun fire. He has carried out upwards of sixty night-bombing raids, and has himself dropped over five tons of bombs. By his keenness and skill as an observer he has been of the greatest assistance to the pilots with whom he has flown.

Lieut. HARRY ALEXANDER RIGBY, R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty. He has carried out many low-flying bombing raids, obtaining direct hits on enemy troops, hutments and camps. On one occasion, after attacking a large column of enemy infantry on a road with machine-gun fire, he attacked and shot down in flames a hostile scout. His work has always been carried out with the utmost keenness and determination.

T. Lieut. CHARLES CRICHTON ROBSON, R.F.C.—For conspicuous gallantry and devotion to duty. He completed a long-distance reconnaissance under very trying weather conditions, and succeeded in returning with the most valuable information. He has shown himself to be very cool and resourceful under all circumstances.

Lieut. GEORGE HOWARD HOMER SCUTT, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. He has destroyed one hostile machine, and driven down three others out of control. He carried out an important single-machine reconnaissance, frequently descending to a height of 100 ft. under heavy rifle and machine gun fire, and obtained valuable information. While returning, he attacked five enemy machines, and ably assisted his pilot in driving them back over their lines. He has carried out many successful photographic reconnaissances, and has at all times proved himself to be a keen and daring officer.

Lieut. HERBERT WHITELAY SELLARS, R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty. Whilst on offensive patrol, he attacked a hostile two-seater machine, which dived vertically and eventually crashed. Having attacked another two-seater machine, which dived down over the enemy's lines, he engaged three hostile scouts, at the nearest of which his observer fired two bursts at 75 yards range, causing the enemy machine to crash down in flames. His skill and gallantry have been most marked.

T. Sec. Lieut. WILLIAM ERNEST STATON, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty. On one occasion, when on offensive patrol, he, by the skilful handling of his machine and accurate shooting destroyed two enemy aeroplanes and brought down a third out of control.

In addition, during the nine days previous to this, he had destroyed five other enemy machines, two of these being triplanes. The services which he has rendered have been exceptionally brilliant, and his skill and determination are deserving of the highest praise.

Lieut. (T. Maj.) **FREDERICK WILLIAM STENT, R.F.C., Spec. Res.**—For conspicuous gallantry and devotion to duty. He attacked and brought down a hostile two-seater, the observer of which was in a position to give the enemy valuable information of our movements. On another occasion he encountered and brought down an enemy two-seater, wounding both pilot and observer, who were made prisoners. On both occasions he showed great gallantry and ability.

T. Sec. Lieut. **WILLIAM SAMUEL STEPHENSON, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. When lying low and observing an open staff car on a road, he attacked it with such success that later it was seen lying in the ditch upside down. During the same flight he caused a stampede amongst some enemy transport horses on a road. Previous to this he had destroyed a hostile scout and a two-seater plane. His work has been of the highest order, and he has shown the greatest courage and energy in engaging every kind of target.

Lieut. **EWART ELLIOT STOCK, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. During an engagement he bombed enemy troops who were approaching a bridge and caused great confusion among them. He then attacked, with machine-gun fire from a very low altitude, the troops, who were endeavouring to cross the bridge. Diving on to several parties of the enemy who remained on the bridge in a state of indecision, he almost completely annihilated them. His action undoubtedly hampered the enemy by making the bridge impassable for half an hour. On numerous other occasions he disorganised and hindered the enemy's advance by his attacks on troops and transport. He has destroyed three hostile machines, and has always set an excellent example of courage and enterprise.

T. Capt. **THOMAS KENYON TWIST, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. On several occasions he has successfully carried out observations on hostile batteries, has under the most adverse weather conditions bombed and engaged with machine gun fire hostile troops and transport, and has on twelve occasions fought and driven away superior numbers of enemy machines, two of which he succeeded in bringing down out of control. He has at all times set a most magnificent example of dash and daring, and has accomplished most valuable and successful work.

Lieut. **THOMAS HENRY UFFILL, R.F.A., Spec. Res. and R.F.C.**—For conspicuous gallantry and devotion to duty. On one occasion, observing a hostile scout, he at once attacked and fired 1,000 rounds at close range. The hostile plane went down in a steep glide and crashed to earth. Later, when on contact patrol, his machine was damaged and forced to land just behind our lines. Although under heavy shell fire, he, assisted by another officer, succeeded in salvaging all the instruments and equipment on the machine before destroying it. He has set a very high example of courage and devotion to duty during the recent operations.

T. Sec. Lieut. **ERIC RALPH VARLEY, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. Observing two enemy two-seater machines, he, by skilful piloting, obtained a position under the tail of one and opened fire at close range, with the result that the hostile plane fell out of control and crashed. On two later occasions he attacked and destroyed two other hostile machines, the pilot of one being taken prisoner. He has also shown great dash in attacking enemy balloons and hostile troops on the march, and has displayed marked gallantry throughout.

T. Capt. **STEPHEN WYNN VICKERS, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. He has taken part in fifty-three night bombing raids on enemy aerodromes, billets and communications, flying at times in most unfavourable weather and in the face of intense rifle and machine-gun fire. On two occasions he made three flights in one night, reaching his objective on each occasion and doing considerable damage with direct hits. He has set a splendid example of courage and determination to the rest of his squadron.

Sec. Lieut. **GERALD GLADSTONE WALKER, North Lancs Regt. and R.F.C.**—For conspicuous gallantry and devotion to duty. On one occasion he assisted in an attack on enemy transport, dropping eight bombs and firing 300 rounds into its midst with the result that several limbers were completely destroyed and severe casualties inflicted on the enemy. Later in the same day he again attacked enemy transport, causing a stampede amongst the horses and inflicting many casualties. Whilst returning to his aerodrome he attacked

with machine gun fire two hostile batteries in action, firing 400 rounds into their midst. His pluck and determination were beyond all praise.

T. Sec. Lieut. **WILLIAM EDWIN WARDEN, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. When on a low-flying patrol he attacked seven scouts, one of which he succeeded in sending crashing to earth. Previous to this he had attacked and sent down out of control another hostile scout. He has also brought back accurate and valuable information regarding hostile movements, and has flown at very low altitudes in order to engage enemy troops, and transport. His skill, determination and courage have been most marked.

T. Capt. **ERIC WATERLOW, Gen. List and R.F.C.**—For conspicuous gallantry and devotion to duty. He carried out two long reconnaissances, flying at a very low altitude, and brought back most valuable information. During one of these flights he was attacked by a hostile scout, which he destroyed. He has carried out four exceptionally long flights, during each of which he took a great number of photographs. He has always undertaken himself the longest and most arduous operations given to his flight, and by his skill, gallantry and determination has on each occasion completed his task with the greatest success.

Lieut. (T. Capt.) **FRANK GERALD CRAVEN WEARE, East Kent Regt. and R.F.C.**—For conspicuous gallantry and devotion to duty. In the course of eight days' operations he destroyed two enemy machines, drove down one out of control and enabled his observer to destroy two others. During an earlier engagement he carried out two valuable reconnaissances at a low altitude. He showed a splendid fighting spirit and displayed great skill and judgment in leading his formation.

T. Sec. Lieut. **ERIC IRWIN WELLS, Rifle Brigade, attached R.F.C.**—For conspicuous gallantry and devotion to duty. While he was flying over the enemy's lines the petrol tank of his machine was shot through and immediately afterwards the left aileron was shot away. The machine was side slipping out of control towards the enemy's position, and the pilot tried in vain to turn it back to our lines. With great presence of mind he climbed out on to the right wing and brought the machine to an even keel, enabling the pilot to land it 100 yards behind our front line. But for his great coolness and resource the machine would undoubtedly have crashed to earth in the enemy's lines. He has done excellent work on many occasions, and has obtained much valuable and accurate information.

T. Sec. Lieut. **HARRY WISNEKONITZ, R.F.C.**—For conspicuous gallantry and devotion to duty. On one occasion, during a very thick mist, he and his pilot, by flying very low, despite very heavy machine-gun fire, succeeded in locating the enemy's position. Though their machine was hit in all the vital parts it was flown back to the aerodrome in safety. On a later occasion, when on contact patrol, during failing light they succeeded in locating accurately the position of the enemy. They have shown the utmost gallantry and skill during recent operations, and have carried out their duties with the greatest courage and determination.

Canadian Force.

Lieut. **JOHN EDWARD HANNING, Engineers and R.F.C.**—For conspicuous gallantry and devotion to duty. When as observer on patrol he was endeavouring to shoot down a hostile balloon, he was at once attacked by a hostile scout. Although his machine gun was on two occasions put out of action, and though he himself was wounded in the leg, he succeeded in firing a long burst into the enemy machine, the pilot of which collapsed in his seat, his machine spinning to the ground. The controls of his own machine were so badly damaged that his pilot could not fly it. He therefore fitted a dual control, and succeeded in bringing the machine back to our lines and landing it safely. His great courage, skill, and determination undoubtedly saved his pilot's life.

Lieut. **HERBERT RAE KINCAID, Infantry and R.F.C.**—For conspicuous gallantry and devotion to duty. On one occasion he succeeded in completing a very long distance reconnaissance over the enemy's lines under the most difficult conditions, and returned with information of the greatest value. He has performed most efficient work on photographic reconnaissances during the recent operations, the work being carried out on several occasions at very low altitudes.

Lieut. **JOHN EDUARDES PUGH, Can. Loc. Forces and R.F.C.**—For conspicuous gallantry and devotion to duty. He carried out twenty successful bombing raids and fifteen long-distance photographic reconnaissances, showing great determination in carrying out his work, in spite of strong opposition by enemy aircraft. In two days he took 108 photographs in the course of long-distance flights. During a period of five days

he dropped three-quarters of a ton of bombs on enemy troops and transport, and engaged ground targets with machine-gun fire from a low altitude. On one occasion whilst on a bombing raid he was attacked by five enemy machines, one of which he destroyed. He set a splendid example of skill and resource.

Lieut. FRANK HAROLD TAYLOR, Cent. Ont. Regt., attached R.F.C.—For conspicuous gallantry and devotion to duty. On one occasion, whilst on offensive patrol, he shot down a hostile scout in flames and a second out of control. On the following day he shot down an enemy triplane, which finally crashed to earth. During the recent operations he has carried out many successful attacks on enemy infantry from low altitudes, and has taken part in over eighty offensive patrols. His gallantry and good service merit the highest praise.

Australian Imperial Force.

Lieut. JOHN RUTHERFORD GORDON, Aus. F.C., attached R.F.C.—For conspicuous gallantry and devotion to duty when, as observer on an offensive patrol, he shot down and destroyed three hostile machines. Previous to this he had shot down two enemy tri-planes, one of which crashed to the ground in flames. He has also effectively and repeatedly scattered massed bodies of enemy troops by accurate shooting from a height of 100 ft. His skill and daring have been of the highest order.

Lieut. (T. Capt.) GARNET FRANCIS MALLEY, Aus. F.C., attached R.F.C.—For conspicuous gallantry and devotion to duty. When on offensive and low-flying patrol he attacked one of two hostile scouts, which eventually turned over and fell out of control, being seen to crash by another pilot. Later, a general engagement ensued with four enemy scouts, one of which he attacked, with the result that it fell completely out of control and crashed. Prior to this occasion he had also shot down out of control another hostile machine. His courage and able leadership have resulted in his patrol carrying out excellent work under the most adverse conditions.

Lieut. ALBERT ERNEST ROBERTSON, Aus. F.C., attached R.F.C.—For conspicuous gallantry and devotion to duty. When carrying out a low-flying bombing patrol, he observed a hostile triplane, accompanied by three scouts. He fired a burst of 30 rounds at very close range, and the hostile plane turned over on its side and crashed. Then, seeing an enemy scout below him, he fired 20 rounds into its cockpit, and it fell down vertically out of control. In addition to these, he has shot down one other enemy machine, which finally crashed to earth. His dash and daring have been at all times most marked.

Lieut. FRANCIS JAMES SCOTT, F.C., attd. R.F.C.—For conspicuous gallantry and devotion to duty. After carrying out a bombing attack, he observed an enemy plane, into which he fired 80 rounds. The hostile plane turned on its back and crashed to earth. Four days previous to this he had destroyed an enemy two-seater machine and had sent down out of control a hostile scout. In addition to these, he had destroyed another hostile two-seater machine. He had displayed marked courage and determination.



Sir Douglas Haig's Thanks to the R.A.F.

THE following telegram has been sent by Field-Marshal Sir Douglas Haig to G.O.C., Royal Air Force, France:—

"I wish to express my high appreciation of the brilliant work performed by the Royal Air Force throughout the recent operations. By defeating the enemy's aircraft, and thereby carrying out the important work of observation without interruption, and by harassing the enemy's movements by bombing and machine-gun fire, the Royal Air Force have rendered all-important assistance to the other arms. Their constant successes have greatly encouraged their comrades in the field.

"I cannot express in terms of sufficient strength my admiration for the gallantry and skill of all ranks of the Royal Air Force."

Back from Germany.

THE following soldiers, who were prisoners in Germany, have arrived in Holland for internment:—

Royal Flying Corps.—10805 E. Coleman, 10387 T. N. Robinson, 4995 P. J. Shaw, 3813 H. Taylor.

M.S.M. for the Royal Air Force.

It is announced in the *London Gazette* that the King has approved of the adoption of the Medal for Meritorious Service by the Royal Air Force, for the recognition of valuable services rendered in the field by warrant officers, non-commissioned officers and men, as distinct from actual flying service. The first list of awards was published in "FLIGHT" of June 6th, 1918.

The following are the correct descriptions of Officers upon whom rewards have recently been conferred:—

■ Sec. Lieut. LESLIE ARCHIBALD POWELL, M.C., Gloucester Regt., attached R.F.C.

(Bar to M.C. gazetted December 17th, 1917.)

The deed for which the award of the M.C. was gazetted to Sec. Lieut. (T. Lieut.) FRANK WILLIAM HENRY THOMAS, Yeomanry and R.F.C., is cancelled and the following substituted:—

"For conspicuous gallantry and devotion to duty. Whilst returning from a bombing raid he was attacked by four hostile machines, one of which he succeeded in bringing down. He was then severely wounded, and on two occasions lost consciousness. He nevertheless successfully brought his machine back and landed it undamaged on his aerodrome. His pluck and determination were worthy of the highest praise."

(M.C. gazetted with deed March 7th, 1918.)

D.C.Ms. for R.A.F.

It was announced in a supplement to the *London Gazette*, on June 26th, that the King has been pleased to award the Distinguished Conduct Medal for gallantry and distinguished service in the Field to the following:—

2565 Corpl. W. Beales, R.A.F.; 1429 Sergt. E. J. Elton, M.M., R.A.F.; 125192 L.-Corpl. A. Stevenson, Lovat's Scouts, now R.A.F.

Military Medals for the R.F.C.

It was announced in a supplement to the *London Gazette*, on June 27th, that the King has been pleased to approve of the award of the Military Medal to the following:—

428 Flt.-Sergt. C. F. Ford, R.F.C.; Aus. 807 2nd Air-Mech./P. Brown, Aus. F.C.; Aus. 319 2nd Air-Mech. W. E. Ries, Aus. F.C.

Albert Medal for R.N.A.S. Officer.

THE KING has been pleased to award the Albert Medal to Acting Flight Com. PAUL DOUGLAS ROBERTSON, R.N.A.S., in recognition of his gallantry in endeavouring to save life in February last. The circumstances are as follows:—

On February 28th, 1918, a seaplane got out of control and spun to the ground. Acting Flight-Com. Robertson, the observer, jumped from the machine just before it reached the ground and landed safely, as the ground was marshy. The pilot, Flight Lieut. H. C. Lemon, was imprisoned in the seaplane, which, on striking the ground, immediately burst into flames, and, notwithstanding that the vicinity of the seaplane was quickly a furnace of blazing petrol, and that heavy bombs, a number of rounds of ammunition, and the reserve petrol tank were all likely to explode, Acting Flight-Com. Robertson returned and endeavoured to extricate the pilot, and only desisted when he had been so severely burned in the face, hands and leg that his recovery was for some time in doubt.

He displayed the greatest gallantry, self-sacrifice, and disregard of danger in his efforts to extricate the pilot.

Aerial Postal Services in Austro-Hungary.

A POSTAL air service between Budapest and Vienna was to start on July 4th, the despatch leaving the former place between 4 and 5 p.m., and the return delivery being made between 7 and 8 the next morning. Special stamps have been designed for the service. Within the next six weeks it is proposed to start a service between Budapest, Arad and Kolozsvár.

New German Identification Mark.

FROM a German source the *Nieuwe Rotterdamsche Courant* learns that a change has been made in the marking on German machines. The arms of the black cross are now straight—and not curved—with white edges. The change is said to have been made because the previous form made recognition of German machines very difficult, and because it easily led to confusion with the circular signs on hostile aeroplanes.

Air Fight Over Holland.

It was reported from Nes (Ameland) on Monday that two German aeroplanes passed over the island on the previous afternoon, pursued by five machines, probably French. The pursuers' fire could be continually seen and heard, as both groups were over Dutch territory and were fired at by the coastguard. One German machine flew very low, evidently having been hit. The five French machines returned westwards an hour and a half later.

REPORT ON THE FRIEDRICHSHAFEN BOMBER.

[Issued by the Technical Department (Aircraft Production), Ministry of Munitions.]

THIS machine, which bears the mark F.D.H. G.3. 326/17, was brought down by anti-aircraft fire at Isbergues on the night of the 16th February. A shell made a direct hit on the right-hand engine at a height of 8,000 to 9,000 ft., after which the machine covered about six miles and made a fairly good landing.

Various parts of the structure bear different dates, that on the tail being 14/1/18. The main spars are branded with a small crown and the letters Z.A.K. The following is painted on the side of the body:—

Leergewicht (weight empty), 2,695 kilogrammes = 5,929 lbs.

Nutzlast (useful load), 1,235 kilogrammes = 2,717 lbs.

Zulässiges Gesamtgewicht (permissible total weight), 3,930 kilogrammes = 8,646 lbs.

Crew.

This machine carried its full complement of four persons, namely, pilot, fore-gunner, after-gunner, and bomber. It is known, however, that the number of crew varies considerably, as some machines of this type have only carried two persons. The accommodation is so arranged that the personnel can easily change places, all the cockpits being inter-communicating.

General Description.

The general design of the machine is shown in the attached drawing, which gives plan and front and side elevations.

The principal dimensions are as follows:—

Span 78 ft.	Balance area .. 1.8 sq. ft.
Maximum chord 7 ft. 8 ins.	Area of flap on
Gap .. 7 ft.	lower wing .. 16 "
Dihedral angle in the vertical plane .. 1½°	Balance area .. 1.56 "
Dihedral angle in the horizontal plane .. 6°	Total area of fixed tail planes .. 57.6 "
Total area of main planes .. 934.4 sq. ft.	Total area of elevators .. 32 "
Area of upper main planes without flap .. 480 "	Balance area of one elevator .. 1.7 "
Area of lower main planes without flap .. 454.4 "	Area of fin .. 20 "
Load per sq. ft. .. 9.24 lbs.	Area of rudder .. 19.2 "
Weight per h.p. 16.6 lbs.	Balance area of rudder .. 3 "
Area of flap of upper wing .. 21.6 sq. ft.	Maximum cross section of body 19.2 "
	Horizontal area of body .. 133 "
	Vertical area of body .. 131.2 "
	Length overall .. 42 ft.

The machine is built up upon a central section, to which are attached the forward and rearward portions of the fuselage and the main planes. This central section comprises the main cell or cabin of the body containing the tanks, bombs, &c. It also embraces the engines and the central portion of the upper and lower planes. The latter, together with the engine struts, are largely built up of steel tube, as is also the landing gear.

The central portion of the body, which measures 4 ft. across by 4 ft. 3 ins. in height, consists of a box formation made of ply wood, strengthened by *longerons* and diagonals, and transversely stiffened by ply-wood bulkheads. The bulkhead furthest forward acts as an instrument board, behind which are side by side the seats of the pilot and his assistant. The former has a fixed upholstered seat, whilst that of the latter is folding, consisting of a light steel tubular framework with a webbing back-rest.

Underneath these two seats is the lower main petrol tank. Behind this cockpit the body is roofed in with ply wood, the rear part of which roofing is detachable so as to give access to the second main petrol tank, which is at the rear end of the main body section. By this means a small cabin or covered passage-way is provided, at each side of which are the racks for the smaller bombs.

Central Portion of Wings.

The central and non-detachable portion of the upper plane has a span of 19 ft. 5 ins., whilst at each side of the *nacelle* the lower plane fixed portion measures 7 ft. 8 ins. The main wing spars in this central portion are of steel tube, roughly 2 ins. in diameter, with a wall thickness of ¼ in.

As shown in the photograph Fig. 1, these spars are braced by steel tubes arranged in the form of an X, the manner in which the bracing tubes are attached to the main spars being shown in the sketch Fig. 2.

The lugs are built up by welding, and are pinned and riveted in position, the joint being of the plain knuckle type.

The upper surface of the lower plane is, so far as the central section is concerned, covered in with three-ply wood.

In this portion the main ribs are of three-ply, with spruce flanges. Between each main rib is a cut-away rib, the design of which is shown in the sketch Fig. 3. This, unlike the main ribs, is one piece of wood, and not built up. For the greater part of its length it applies to the top surface only, being cut away to pass clear of the cross bracing tubes.

As shown in the photograph Fig. 1, the plane is further stiffened with transverse members consisting of three-ply panels between each rib strengthened by grooved pieces top and bottom. The latter are attached as shown in the sketch Fig. 4, and the attachment of the flanges of the main ribs is shown in Fig. 5.

The central section of the upper main plane is in one piece, and is covered top and bottom with fabric. In order to facilitate the removal of the engines, detachable panels measuring 1 ft. 11½ ins. long by 1 ft. 8 ins. deep are let into the trailing edge immediately over the engine bearers. These panels are socketted in front, and at the rear are joined up at the trailing edge with U-section sheet steel clips and bolts.

The struts which connect the top of the *nacelle* to the upper plane are tubular and of streamline section, as are also the engine bearer struts. A section of one of the latter is given in Fig. 6. The thickness of the wall is one-sixteenth of an inch.

The method of attaching the lower end of the engine struts

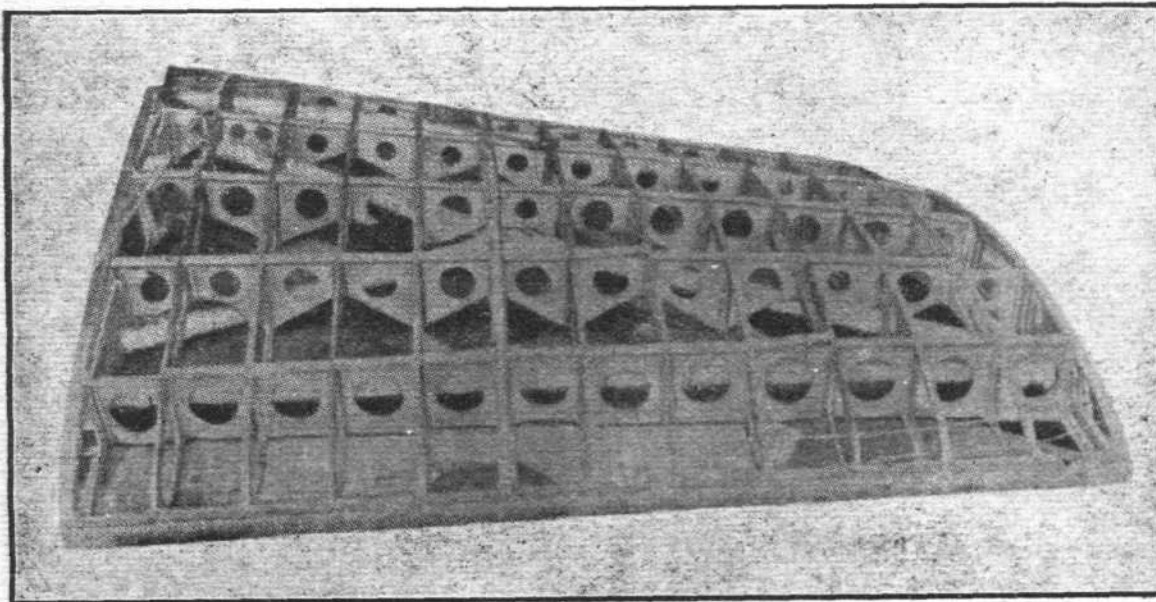
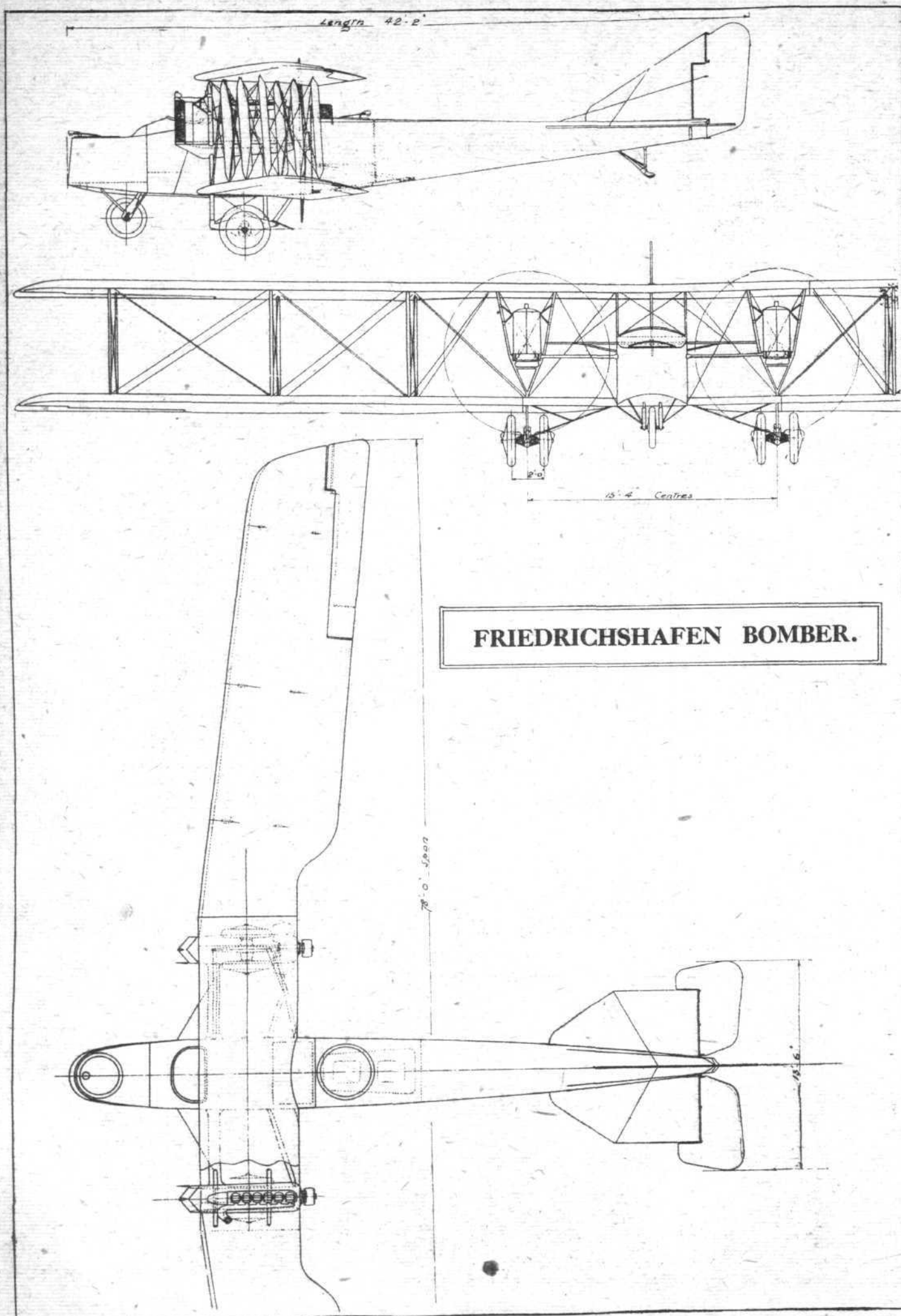


Fig. 1.—Centre section of lower main plane with three-ply surfacing removed.



FRIEDRICHSHAFEN BOMBER.

General arrangement drawings of the Friedrichshafen bomber.

to the tubular steel spars is shown in the sketch Fig. 7, from which it will be seen that a welded Y socket is used and secured

ends the engine struts are fixed to the top plane spars with pin joints, as shown in Figs. 8 and 9, the attachment differing

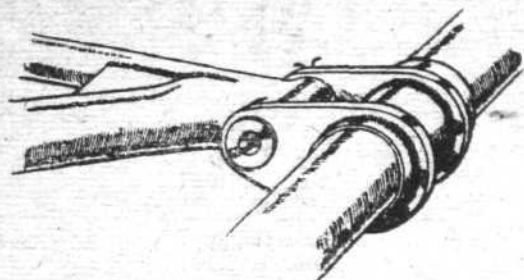


FIG. 2.

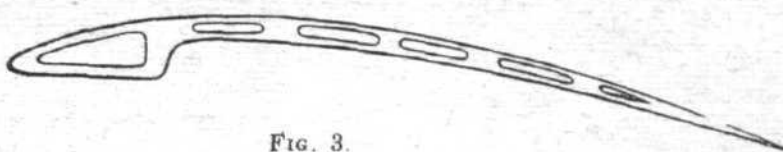


FIG. 3.



FIG. 4.



FIG. 5.

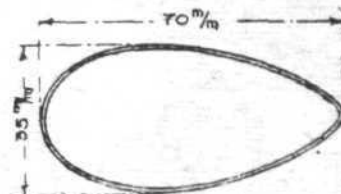


FIG. 6.

by a pin joint, the ends of the pin acting as anchorages for the attachment of the bracing wires.

according to the number of wire bracings that are to be taken to each joint.

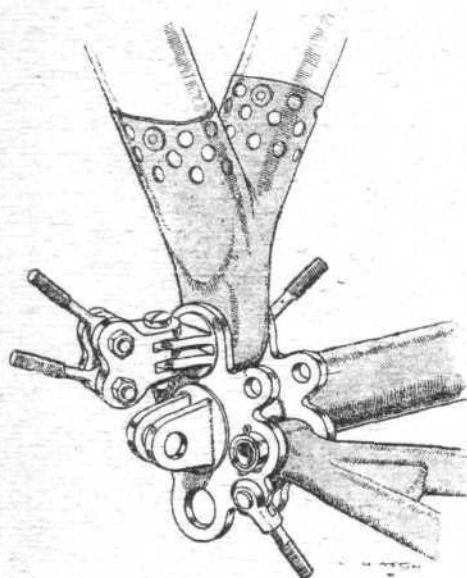


FIG. 7.

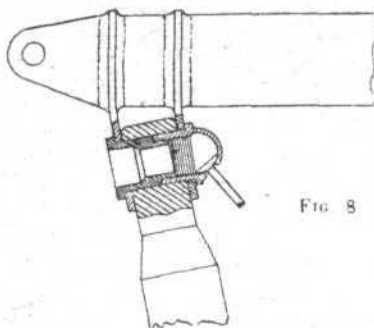


FIG. 8.

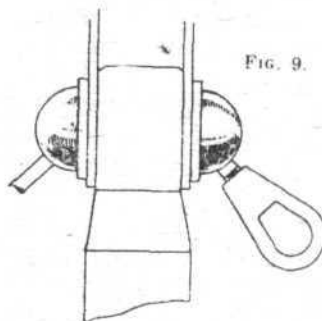


FIG. 9.

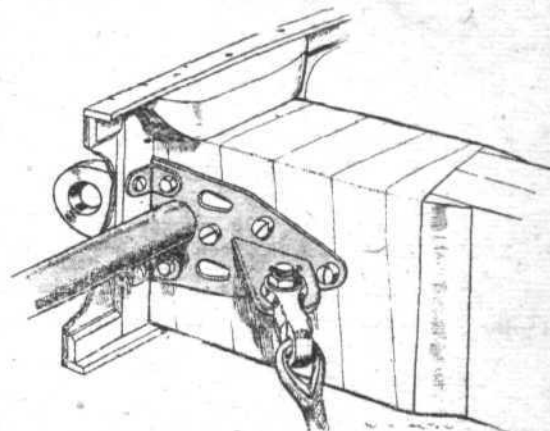


FIG. 10.

This sketch also shows the lugs which respectively support the detachable portion of the main planes and the vertical strut of the landing chassis. The engine bearer struts are

Construction of Wings.
The detachable portions of the wings are fixed to the centre section by pin joints, one part of which is shown in Fig. 7.

FIG. 11.

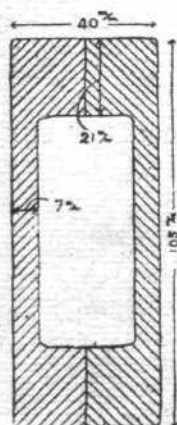
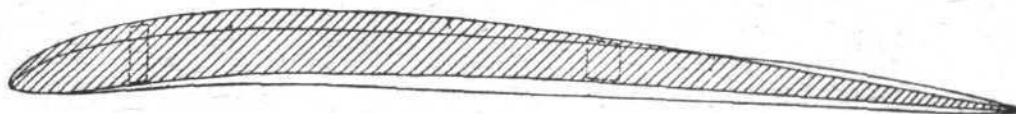


FIG. 12.

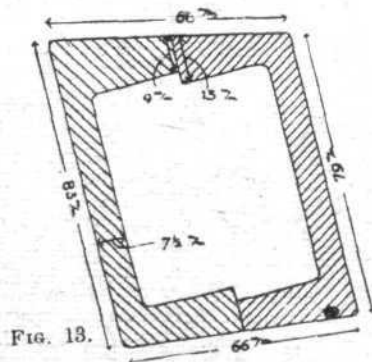


FIG. 13.



FIG. 14.

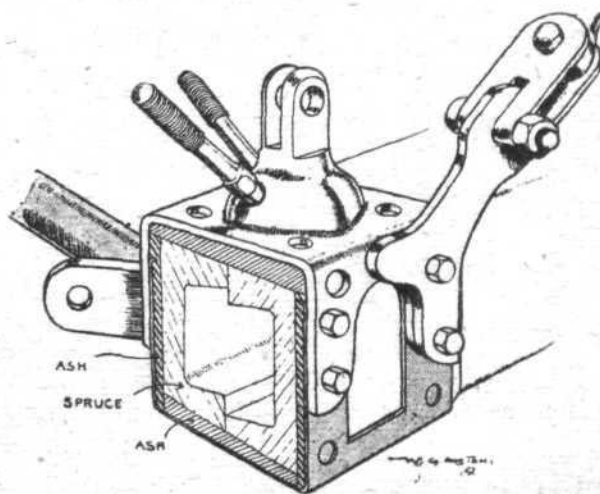


FIG. 15.

pushed into the Y socket and pinned in position, the pins being afterwards brazed into the socket. At their upper

the male portion being represented in Fig. 10. The chord of the wing in the line of flight varies from approximately

7 ft. 8 ins. to 7 ft. 5 ins., and the wing section is shown shaded in Fig. 11. In order to provide a basis of comparison the R.A.F. 14 wing section is superimposed and drawn to the same scale.

The main spars are placed one metre apart, the front spar

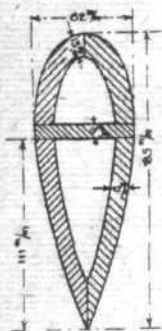


FIG. 16.

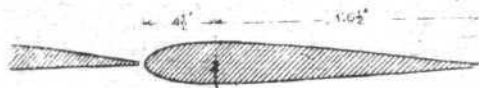


FIG. 18.



FIG. 17.

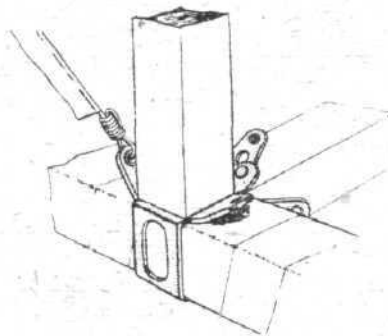


FIG. 19.

being 272 mm. in the rear of the leading edge. Both spars are of the built-up box type, as shown in Figs. 12 and 13. The former is the leading spar and the latter the rear spar. These spars are of spruce, and each half is furnished with

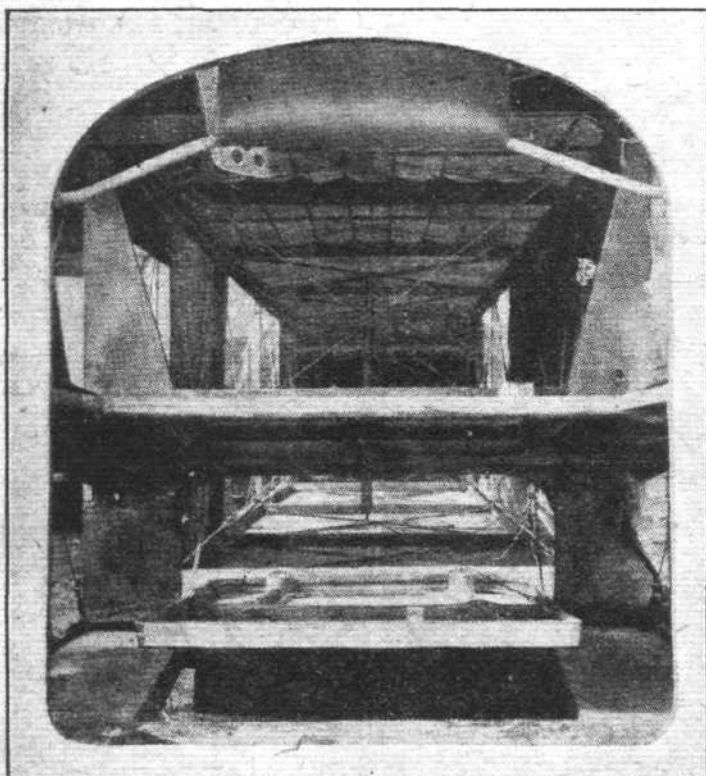


Fig. 20.—View looking down inside of fuselage from the main nacelle, showing trap-door and after-gunner's folding seat.

several splices, so that the greatest single length of timber in them is not more than 14 ft. The splices, which occur in each half alternately, are of the plain bevel type about 15 ins. long and wrapped with fabric. A fabric wrapping is also applied at short intervals along the spar.

Internal cross bracing between the main spars is afforded by steel tube cross members and cables attached as shown in the sketch Fig. 10.

The main spar joint consists of a steel plate 19 mm. thick embedded in the spar end and held in position by 5 bolts, which pass through a strapping plate surrounding the end of the spar. This plate also carries the attachment for the bracing cable, and is furnished with a spigot which locates the bracing tube. It will be seen that at this point the spar is provided with tapered packing pieces of hard wood glued and held in position by fabric wrapping.

The main ribs are placed 360 mm. apart. Between them are auxiliary formers, consisting of strips of wood 20 mm. x 10 mm. thick, which run from the leading edge to the rear spar. The main ribs consist of ply wood webs socketed into grooved spruce flanges, which are tapered off as shown in Fig. 5, except where they are met by a longitudinal stringer. The leading edge is solid wood moulded to a semi-circular section of approximately 65 mm. diameter. Where the rib web abuts against it, packing pieces are glued each side. Between the main spars the web of the rib is divided by three vertical strips into four panels, and in each of these it is perforated, leaving an edge all round about 72 mm. wide.

As shown in Fig. 10, the upper flange of the main ribs is carried clear of the leading spar by means of packing pieces. In the case of the rear spar, packing pieces are also used under the rib flange, as shown in Fig. 14.

The lower main planes for a width of about 2 ft. 3 ins. at their inner end are covered as to their top surface with three-ply wood.

The interplane struts are attached to the main spars by joints of the type shown in Fig. 15. This, it will be seen,

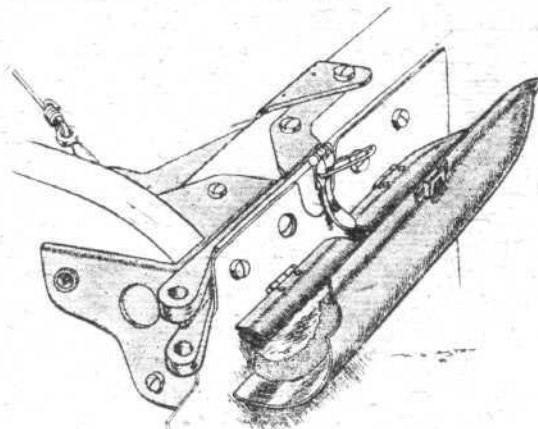


FIG. 21.

follows the typical German practice of partially universal jointed mountings for the cable attachments. At the points of attachment of these strut joints, suitably tapered packing pieces of hard wood surround the spars, which at these points are also wrapped with fabric.

Struts.

Outside of the centre section the interplane struts are of wood built up, as shown in the section Fig. 16, of five separate pieces. The curved portions are of timber which has not yet been identified, but is apparently of poor quality. The cross web is of ash. The strut is wrapped at frequent intervals with strips of fabric and is fitted with a socket joint of the type shown in Fig. 17. The outer pair of struts are of smaller section than the main struts, but are built up in a similar manner. Their section is 125 mm. x 40 mm.

Ailerons.

The framework is principally of welded steel tube wrapped with fabric.

A notable point is the thick section of the leading edge of the balanced portion, as shown in Fig. 18.

Fin and Fixed Tail-planes.

The framework of these is steel tube, and in the case of the tail-planes wooden stringers running fore and aft are arranged at intervals. The tail-planes are supported by diagonal steel tubes of streamline section, on the under side of which sharp steel points are welded to prevent these stays being used for lifting purposes.

Elevators and Rudders.

The framework in each case is of steel tube, the main tube being 35 mm. in diameter and the remainder 15 mm.

Bracing.

Throughout the wings, both internally and externally, the bracing is by means of multistrand steel cable.

Fuselage (Rear Portion).

At the after-gunner's cockpit the section of the fuselage has a rounded top, which is gradually smoothed down into flat. The section, for the greater part of the length, is rectangular, and the frame is built up in the usual manner with square section longerons and verticals, the joints being arranged as shown in Fig. 19. The cross bracing wires along the sides, top, bottom, and diagonal are of steel piano wire and are covered with strips of fabric, as shown in this sketch, where they lie adjacent to the fabric fuselage covering.

The vertical and horizontal compression members are located by spigots. The joint consists of a plate which completely surrounds the longerons, its two ends being riveted together to form a diagonal bracing strip. For the last few feet at the tail the fuselage is covered with thin three-ply.

Fig. 20 is a view looking down the rear portion of the fuselage. The fuselage is covered with fabric, which is held in position by a lacing underneath, and is consequently bodily removable.

The floor of the after-gunner's cockpit is elevated above the bottom of the fuselage. Immediately underneath this cockpit is a large trap door, shown in the photograph No. 20, and also by dotted lines in the plan view of the aeroplane. This is hinged at its rearward end and furnished with two large celluloid windows. It is held in its "up" position by a long

spring and a snap clip. No means could be found by which it could be fixed in its closed position. As footsteps are provided for all the cockpits, this trapdoor is evidently not intended for ingress and egress. It could be employed in connection with a machine gun firing backwards, as in the Gotha, but no machine gun mounting was fixed in this machine for this purpose.

The rear portion of the fuselage is attached to the centre section of the body by a clip at each corner. This is shown in Fig. 21. The rear portion carries a male lug, shown in Fig. 50, which engages with the two eyes, and is held in position by a three-eighths bolt. Four other bolts in tension pass through the sheet metal clip, as shown in the sketch. In each case the lugs are furnished with sheet steel extensions which, as shown in the sketch Fig. 21, are sunk flush into the top and bottom surfaces of the fuselage longerons and are there held with three bolts. The corner joint is welded sheet steel, and there is an additional sheet steel joint which serves the secondary purpose of providing an anchorage for the bracing wires. As this fuselage joint is level with the plane of rotation of the propellers, it is armoured both on the nacelle and on the rear portion of the fuselage with a hinged covering of stout sheet steel lined with felt. A plate of armour a foot wide also extends down each side of the nacelle at this point.

(To be continued.)

"Winged Warfare."

If a thing is worth doing at all it is worth doing well, even if it does happen to be only a book about flying. For that reason alone we are glad to welcome "Winged Warfare," by Major W. A. Bishop, V.C., D.S.O., M.C. It is certainly the best book of its sort which has yet appeared, and it is to be hoped that every pilot who gets an attack of *cacoethos scribendi*—seemingly one of the most insidious perils besetting the path of a pilot—will, at least, strive to do as well as Major Bishop has done.

"Winged Warfare" is a book which the general reader will find an absorbing story, while for the budding "ace" it is full of practical information. Major Bishop tells his experiences in a frank and simple style, and—what is most valuable, especially to those who will try to emulate his magnificent example—he does not hesitate to point out his mistakes, nor does he attempt to gloss over the slips he made. Many times he shows how, by impatience or imprudence, he ran unnecessary risks or got himself into a tight corner which he should have avoided. He has the good sense not to weary his readers with a long rigmarole describing his training, but devotes practically the whole of his book to a description of fighting in the air, with a glimpse here and there of the pilot's life at the Front when off duty. His work at the Front has been varied, including observing and escorting, but the bulk of his attention has been given to fighting in a single-seater scout. There is a temptation to quote, but the difficulty is to know what to take, and after all the best thing is to buy the book. It only costs 6s., and is worth every penny of it. It is illustrated by several

photographs of Major Bishop and his machine from the Canadian official records. Messrs. Hodder and Stoughton are the publishers, and it can be sent by post from "FLIGHT" Offices for 6s. 6d. post free.

Air Raids on Paris.

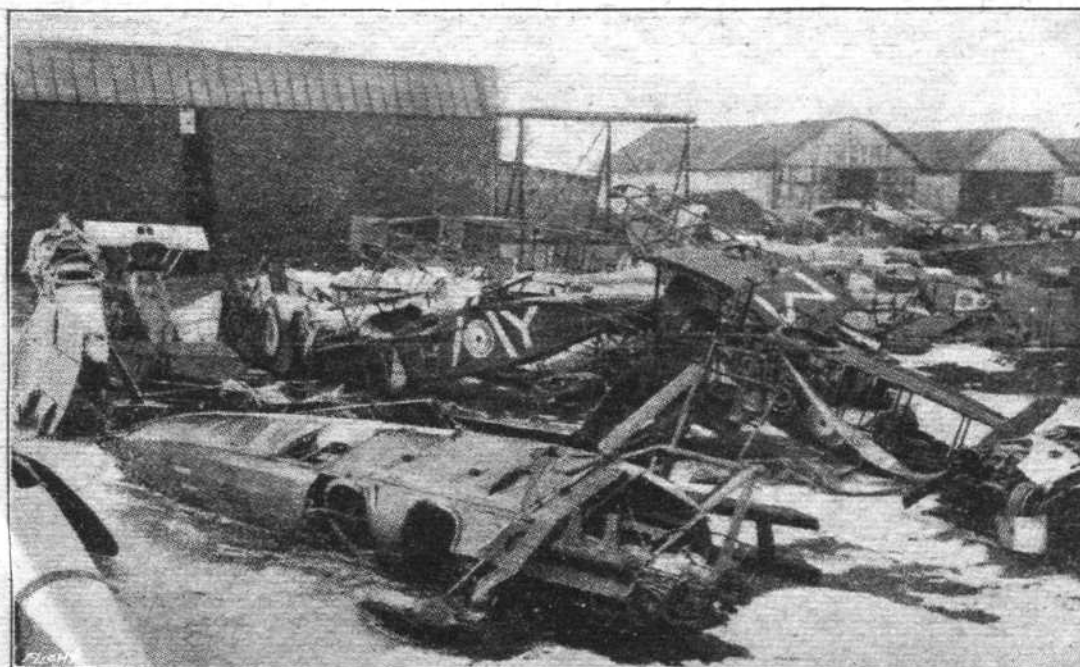
On the night of June 26th German machines attempted to raid Paris. They attacked in several groups, but only a few bombs were dropped. There were no casualties. The alarm was given at 11.16 p.m. and the "All clear" at 12.35 a.m.

The following night another attempt was made. The attack lasted from 10.39 p.m. until 12.5 a.m., and it was rather more violent than its predecessors, though, fortunately, the death roll was comparatively small. Eleven people were killed and 14 were injured. Most of the casualties were among people who were walking in the streets. Some material damage was done.

One Gotha was brought down by anti-aircraft guns in the Forest de Lague, north of Compiègne, one of the crew being killed while the other two were taken prisoners.

A third consecutive visit was paid on the night of June 28th, when the raiders were met by a very violent barrage. A few bombs were dropped, but little damage was done and there were no casualties. The alarm was given at 11.39 p.m. and the "All clear" at 12.30 a.m.

On the night of June 30th-July 1st, there was a double alarm, the first from 11.58 to 12.20, and the second from 12.48 to 2.20. In the second attempt a few bombs were dropped in outlying districts, but no casualties are reported.



In the Hands of the Enemy.—Allied aeroplanes in various stages of disintegration at a German "Clearing Station." It is apparently from the material thus collected that the German reports on British and French machines are drawn up.



JULY 4, 1918.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

SPECIAL COMMITTEE MEETING.

A Special Meeting of The Committee was held on Thursday, June 27th, 1918, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Col. F. Lindsay Lloyd, C.M.G., Lieut.-Col. F. K. McClean, R.A.F., Mr. J. H. Nicholson, and Lieut.-Com. H. E. Perrin, R.N.V.R., in attendance.

Election of Members.—The following New Members were elected:—

Lieut. Robert Walter Anderson, R.A.F.
Charles Boyton.
Major Cyril Gordon Burge, R.A.F.
Gilbert Campling.
Lieut. Bernard Josolyne Ellis, R.N.V.R.
Sec. Lieut. Robert Leon Froenckel (French A.S.C.).
William George Toop Goodman.
Sec. Lieut. William Henry Arthur Heald.
Paul Stanley May
Capt. John Ree, R.A.F.
William Patrick Ryan, J.P.
Lieut. Charles Bertram Swanston (King's Own Scottish Borderers).
Capt. Henry Eric Swanston, R.F.A.(T.).
Stanhope Franklin Tyler.
Staff-Paymaster Philip Francis Wainwright, R.N.V.R.

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916).

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

Brig.-Gen. W. W. WARNER, R.A.F. (Chairman).
Mr. CHESTER FOX.
Lieut.-Col. HARCOURT G. GOLD, R.A.F.
Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F.
Major C. E. MAUDE, R.A.F.

Secretary:

Lieut.-Com. H. E. PERRIN, R.N.V.R.

Bankers:

Messrs. BARCLAY'S BANK, LTD., 4, Pall Mall East,
London, S.W. 1.

Objects:

The Lords Commissioners of the Admiralty and the Army Council having signified their approval, THE ROYAL AERO CLUB has instituted and is administering this Fund for the benefit of Officers, Non-Commissioned Officers and Men of the Royal Air Forces who are incapacitated on active service, and for the widows and dependants of those who are killed.

FLYING SERVICES FUND COMMITTEE.

A Meeting of the Flying Services Fund Committee was held on Thursday, June 27th, 1918, when there were present: Lieut.-Col. T. O'B. Hubbard, M.C., R.A.F., in the Chair, Mr. Chester Fox, and Lieut.-Com. H. E. Perrin, R.N.V.R., Secretary.

Grants and Allowances.—The following Grants and Allowances were made:—

(64) An allowance of £5 a month for six months to the widow of a Flight-Commander in the Royal Naval Air Service who was killed on active service.

(57) An allowance of £2 a month for twelve months to the widow of a 1st Class Air-Mechanic in the Royal Flying Corps who was killed on active service.

(13) An allowance of £4 a month for twelve months to the father of a Lieutenant in the Royal Flying Corps who was killed on active service.

(20) An allowance of £5 a month for twelve months to the widow of a Sergeant in the Royal Flying Corps who was killed on active service.

Subscriptions.

	£	s.	d.
Total subscriptions received to June 18th, 1918	12,760	15	11
Staff and Workers of Gwynnes, Ltd. (Sixty-fourth contribution)	9	13	3
Staff and Workers of Gwynnes, Ltd. (Sixty-fifth contribution)	9	17	8

Total, July 2nd, 1918 12,780 6 10

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

THE ROLL OF HONOUR.

(Where an Officer is seconded from the Army, his unit is shown in brackets.)

Published June 26th.

Previously Missing, now presumed Killed.

Kilner, Flt.-Com. B. D., R.N. Purdy, Flt.-Lieut. C. C., R.N.

Killed.

Gange, Sec. Lieut. P. H. Neill, Lieut. G. W., M.C.
Johnson, Sec. Lieut. C. M. (Lein. R.).
Langdon, Lieut. J. H. Salton, Lieut. W. F.
Tyrell, Capt. W. A.

Died of Wounds.

Steggall, Sec. Lieut. F. L.

Wounded.

Atkinson, Sec. Lt., J. F. V. Hannah, Sec. Lt. W. C.
Bailey, Sec. Lieut. G. (North'd. F.).
Campbell, Sec. Lieut. W. Hawker, Capt. T. McD.
Davies, Sec. Lt. J. H. T. (R.I.F.).
Dixon, Sec. Lt. W. H. (Sea. Nesbit, Lieut. C. H. F. (The
Highrs. Buffs).
Duncan, Sec. Lieut. G. M. Payne, Sec. Lieut. S. R.
Ezard, Sec. Lieut. G. Pollard, Sec. Lieut. R. K.
Gordon, Sec. Lieut. V. Rough, Capt. H. L.
Graham, Sec. Lieut. S. W. Saunders, Lt. J. E. (Lancs.
Gye, Sec. Lieut. H. J. Fus. (T.F.)).
Heron, Sec. Lieut. O. A. P. Saunders, Sec. Lieut. W. W.

Previously Missing, now reported Wounded and Prisoner.

Hill, Sec. Lieut. T. R. V.

Previously Missing, now reported believed Wounded and Prisoners.

Brown, Sec. Lieut. A. C. G. Meredith, Sec. Lieut. J.
Carr, Sec. Lt. C. V. (D. of Pemberton, Sec. Lt. A. L.
Well, R.). Slipper, Lieut. R. A.
McKelvey, Lieut. M. T. Tysoe, Lieut. C. G.

Missing.

Baring, Sec. Lieut. R. A. Marsden, Sec. Lieut. C.
Breckenridge, Sec. Lt. W. McGee, Sec. Lieut. W. R.
Dodd, Sec. Lieut. F. C. Thompson, Sec. Lieut. H.
Johnson, Sec. Lieut. J. H. Windridge, Lieut. E. A.
Manuel, Capt. J. G., D.S.C. Young, Capt. T. V.

Prisoner in German hands.

Richardson, Lt. D. D. (E. Surr., attd. R.F.C.).

Prisoner.

O'Lieff, Sec. Lieut. P. H.

Previously Missing, now reported Prisoner.

Wells, Sec. Lieut. S. R.

Previously Missing, now reported believed Prisoners.

Duce, Lt. W. (Ldn. R. (T.)). Harrington, Lt. H. B. D.
Gillan, Lieut. C. J. (Ldn. R. (T.F.)).
Towne, Sec. Lt. L. L. F.

Published June 27th.

Killed.

Collier, Lt. S., M.C. (Manch. Mason, Lieut. N.
R. (T.F.)). Monk, Capt. E. W. (Lond. R.
Cox, Sec. Lieut. J. W. (T.F.)).
D'Arcy, Sec. Lt. S. H. A., Primrose, Lt. L. J., Aus. F.C.
D.S.O. Smith, Sec. Lt. T. E. (Worc.
Johns, Lt. R. L. R.).

Previously Missing, now reported Killed.

Arnot, Sec. Lt. A. A. McD. Borthistle, Lt. W. J. (R.
Mun. F., attd. R.F.C.).

Wounded.

Aldridge, Lieut. E. D. Murdock, Lt. R. (K.O.S.B.).
Daltrey, Sec. Lieut. F. Rowlands, Sec. Lieut. H.
Lowe, Capt. T. C. Sykes, Sec. Lieut. A. A.
Menhennitt, Sec. Lieut. E. H. (R.F.A., S.R.).
Mason, Sec. Lt. S. D. (Som. Williams, Sec. Lieut. W. H.
L.I.). Withers, Sec. Lieut. A. S.

Previously Missing, now reported Wounded and Prisoner.

Clark, Capt. C. C. (R.A.).

[Previously Missing, now reported believed Wounded and Prisoners.

Atkinson, Sec. Lieut. F.
Jones, Sec. Lieut. A. V.

Tylor, Sec. Lieut. C. E.
Wood, Sec. Lieut. C.

Missing.

Rackett, Lt. A. R., Aus. F.C.

Previously Missing, now reported Prisoner.

Leavitt, Sec. Lieut. H. J.

Previously Missing, now reported believed Prisoners.

Birch, Lieut. S.
Bollins, Sec. Lt. A. P. (King's
L'pool. R.).

Hillyard, Sec. Lt. V. W. H.
Scott-Kerr, Lt. W. F. (Loth.
and Bdr. Highrs.).

AERONAUTICAL INVENTIONS.

THE Air Ministry wishes it to be known that the Air Inventions Committee which was formed about nine months ago, has now received and examined upwards of 5,000 inventions and suggestions relating to the Air Service.

It is regretted that, owing to war conditions, a detailed account of their investigations cannot be published, but the experience of the Committee indicates that it may be possible to publish certain information which will facilitate the work both of inventors and of the Committee.

The following statement has been drawn up with this object in view, but it is realised that it is incomplete for the reason just given. It is appreciated also that inventors are placed at great disadvantages in present circumstances, for, unless immediately connected either with the Air Services or with aircraft manufacture it is almost impossible that they should be acquainted with the most recent developments; so rapid has been the recent rate of progress that it is difficult, even for those in close contact with the Royal Air Force, to keep abreast of all the latest improvements. Again, it is practically useless for inventors at the present time to submit inventions which would necessarily take a long time to develop, the requirements of war and the conditions of labour and material making it impossible for the Committee to support proposals of this nature.

Generally speaking, and as far as the period of the war is concerned, no very startling change in the present type of aircraft is anticipated, although improvements in parts and also in details are always possible and may produce very important results.

The stage of development in construction which has now been reached is such that major improvements can only be expected from those possessing the requisite scientific and mechanical knowledge, skill and experience. Thus, radical changes in the shape of the wings of aeroplanes, the body, and the propellers are only possible after long and patient research carried out in the aeronautical laboratories.

Again, many inventors have forwarded proposals for helicopters and aircraft of this nature which, if an efficient design can be produced, would possess certain advantages (but probably not so great as was once imagined); others have suggested flapping wings and rotatory planes. Such schemes do not give any promise of being developed for use during this war, and in any case would require some years of experiment before they could be regarded as practical proposals.

As regards minor improvements, inventors should bear in mind that many details such as turnbuckles, clips, &c., are now standardised, and a change would only be justified by some very marked superiority.

Safety devices for preventing crashing of the machine and the pilot form a numerous class. The chief of these is the parachute, either applied by a harness to the pilot or directly attached to the machine. Those who have seen a passenger dropped by a parachute from an aeroplane for exhibition purposes often fail to realise the conditions under which a parachute may have to be used as a safety appliance. Then the machine may be out of control, dropping at a velocity of 150 to 200 m.p.h., or spinning downwards in flames. Many other safety devices such as automatic stabilisers, wind-brakes, &c., have been proposed at various times. The additional weight entailed by the use of any of the suggested safety appliances must remain a very serious factor for so long as war conditions prevail.

The engine is the heart of the aeroplane, and on its reliability depends the safety of the pilot. Persons acquainted

Published June 28th.

Killed.

Bowick, Lieut. W. R.
Brewer, Sec. Lieut. T.

Jones, Lieut. M. G., M.C.
(North'd. Fus.).
Scott, Lieut. G. M.

Died of Wounds.

Pither, Capt. S. E. (K.O.S.B.).

Drowned.

Nickells, Sec. Lt. C. C. G.

Wounded.

Bayly, Sec. Lieut. C. J.
Foster, P.F.O. H. E.
Raby, Sec. Lieut. T. D.
Ribett-Carnac, Lieut. W. J.

Storrey, Capt. A. (A.S.C.).
Storrey, Lieut. J. E.
Thursfield, Sec. Lieut. J. T.
(R. War. R.).

Missing.

Belgrave, Capt. J. D., M.C.
(Ox. and Bucks. L.I.).
Brown, Sec. Lieut. J. L.
Legge, Sec. Lieut. W.
Lewis, Sec. Lieut. R. G.

McKenzie, Sec. Lieut. A.
Nicholas, Sec. Lieut. E. M.
Thompson, Sec. Lt. G. F.
Weaver, Capt. J.

only with motor car engine practice sometimes do not realise the exacting conditions under which an aeroplane engine must work. The engine must be capable of running for the whole of the time of flight at its maximum power. The lubrication and ignition must be perfect, and the engine must not become overheated. The rating applied to aeroplane engines is its weight per horse-power, and engines are now being produced which show surprising results in this respect. Inventions which differ radically from present day practice (such as the internal-combustion turbine) have small possibilities of being adopted for successive design and reconstruction entailing probably several years' work are necessary before satisfactory results can be hoped for. In view of the shortages of materials and labour at the present time no new type can be embarked on unless it is demonstrably superior to existing types, and possessed of definite and immediate advantages over them.

A subject which is intimately connected with the power plant is its noise. This constitutes one of the disadvantages of an aeroplane. For night flying a method by which it would be possible to hear from one aeroplane the approach of another, would be of great advantage. The engine can be silenced without serious disadvantages, but the noise of the propeller and the hum of the wires are so great that silencing the engine is not sufficient.

Many proposals for the projection of bombs and grenades of flame and of poisonous gases have been received.

The trailing bomb or grapnel for attacking enemy aircraft and submarines is a favourite suggestion from inventors. This device was tested before the war and at various times since, but has been abandoned in favour of more effective methods.

Instruments.

Many hundreds of inventions and suggestions for inclinometers and instruments for straight flying and accurate bomb dropping have been investigated. Efficient and well-designed instruments for these purposes have been available for some time past, but it is quite possible that improved forms may be produced, though it is scarcely likely that this can be done by anyone who does not possess the necessary scientific and mechanical knowledge required for an investigation of this nature.

Some inventors entirely disregard the action of centrifugal force upon pendulum and spirit level devices.

A large number of gyroscopic instruments have been proposed which show insufficient knowledge of the correct application and limitations of a gyroscope.

Anti-aircraft devices of various kinds are constantly suggested, but now contain very little new matter for consideration, as such proposals have received the careful attention of the authorities for a long time past, and have been the subject of much trial and experiment.

Any proposals of a practical nature which contain feature of novelty and may be of utility, are discussed with the assistance of the Air Service.

The Committee fully appreciate the genuinely patriotic motives which inspire most of the communications which they have received, and it is with the object of encouraging the submission of useful and well-considered proposals that this statement is issued. Inventors should, however, bear in mind that the somewhat obvious proposals which might have been useful in an earlier stage of the war, are now no longer serviceable.

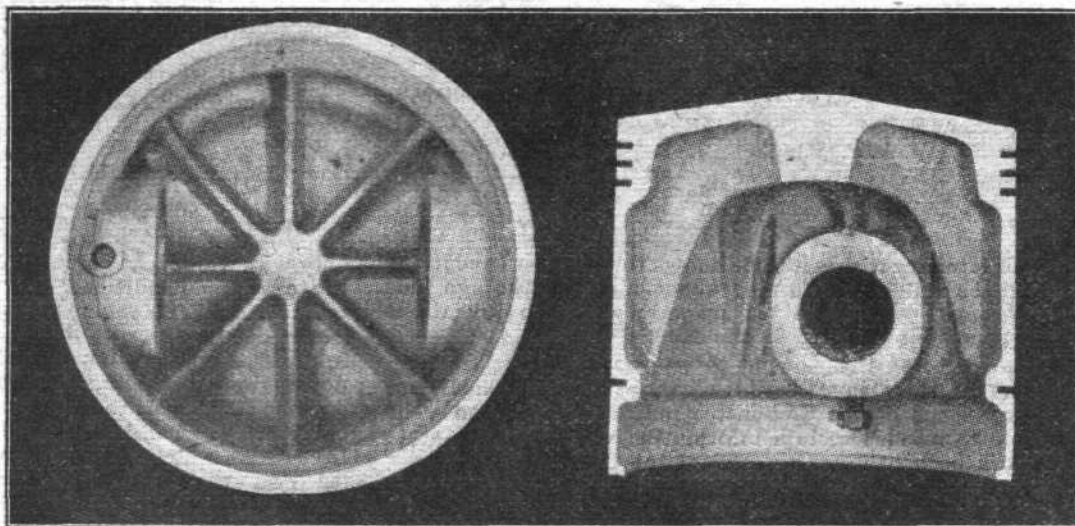
By following the general tenour of the above suggestion inventors will greatly assist the Committee in the execution of their responsible duties.

A 230 h.p. Benz engine, No. 31,560, taken from the Aviatik biplane, G. 130, captured on February 12th, 1918, was found to be fitted with aluminium pistons. As these are the first aluminium pistons to be found in a captured enemy aero engine in service, a detailed report of their design, together with a chemical analysis of the alloy, should be of interest.

which these pistons were fitted. The design of the standard cast-iron Benz piston, which is fitted with a conical steel support, riveted to the inside of the piston crown, and which bears upon the centre portion of the gudgeon pin through a slot cut in the connecting-rod small end, is well known. Unlike the standard cast-iron piston, the domed head of the

Fig. 1.—Left: Inside view of 230 h.p. Benz cast - aluminium piston.

Fig. 2.—Right:
Sectional view of
piston showing
formation of ribs.



The pistons weigh 4 lbs. 8½ ozs., each, without rings, which weigh 1.5 ozs. each. The total weight of the complete piston, with rings and gudgeon pin set screw, is 4 lbs. 14½ ozs., as compared with the standard cast-iron piston, which weighs 6 lbs. 11½ ozs. The gudgeon pins and connecting-rods are of standard Benz design, as also is the rest of the engine to

* A report by the Technical Department, Aircraft Production, Ministry of Munitions.

sand-cast aluminium piston is supported and strengthened by eight webs radiating from a central boss in the piston crown. The formation and shape of the webs is clearly shown in the photographs and sectional drawings of the piston.

Three cast-iron rings are fitted above the gudgeon pin, and one scraper ring is provided below the gudgeon pin. All rings are concentric and are machine hammered on the inside. It will be noticed that the rings are all exceptionally deep in section, being 5.25 mm. deep and only 3 mm. wide vertically. The piston ring gap measured in position in a

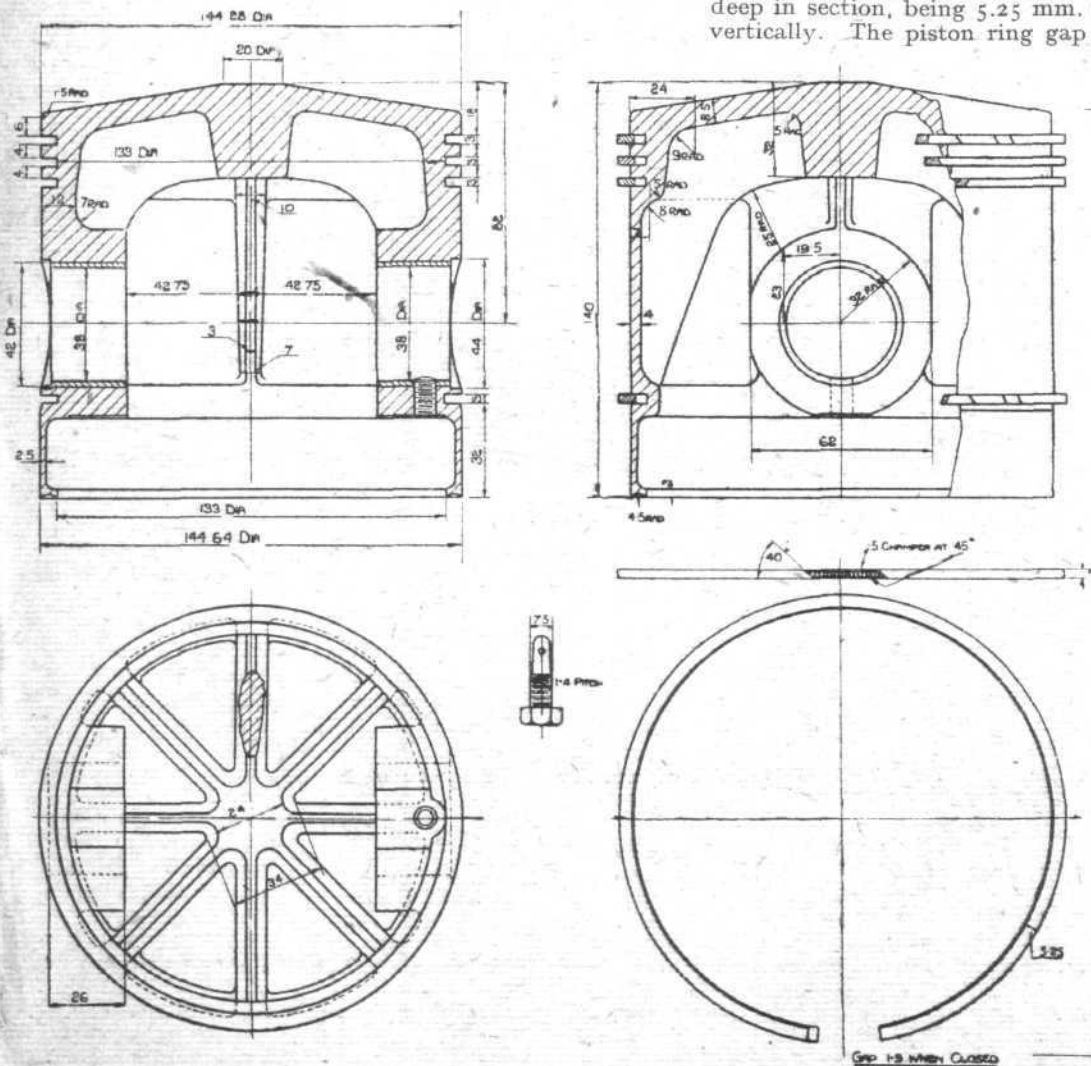
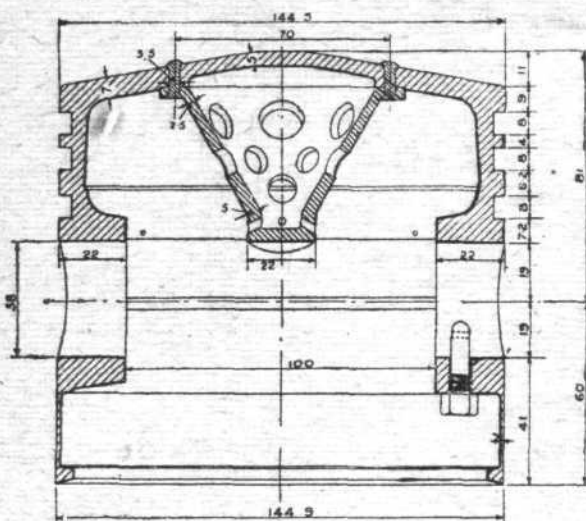


Fig. 3.—Details of aluminium pistons now used in 230 h.p. Benz engines.

standard 230 h.p. cylinder was found to be exceptionally wide *i.e.*, 1.9 mm. As may be seen in Fig. 2, the gudgeon pin bosses are fitted with steel bushes 2 mm. thick. These are cast into the bosses in the usual way. The gudgeon pins are 38 mm. diameter, and the gudgeon pin bosses are 65 mm. diameter. The method of fixing the gudgeon pin by a hexagon-headed set screw and split pin is standard Benz practice.



An annular semi-circular groove 4.5 radius is machined on the bottom lip of the piston, as shown in the section drawing, Fig. 3; and the inside of the skirt is machined inside up as far as the reinforcing rib of the scraper ring directly below the gudgeon pin.

Further details of the design of these aluminium pistons are shown in the illustrations, and the chemical composition of the alloy from a metallurgical analysis carried out at R.A.E. is as follows: Copper per cent., 6.02; zinc per cent.,

12.13; iron per cent., 1.42; silicon, 0.31; tin per cent., nil; nickel per cent., nil; manganese per cent., trace; magnesium per cent., trace.

As the engine from which these pistons were taken was found to be too badly damaged to carry out a test, it has been impossible to ascertain the increased relative efficiency between this engine and the standard 230 h.p. Benz. The compression ratio, however, is apparently slightly higher in

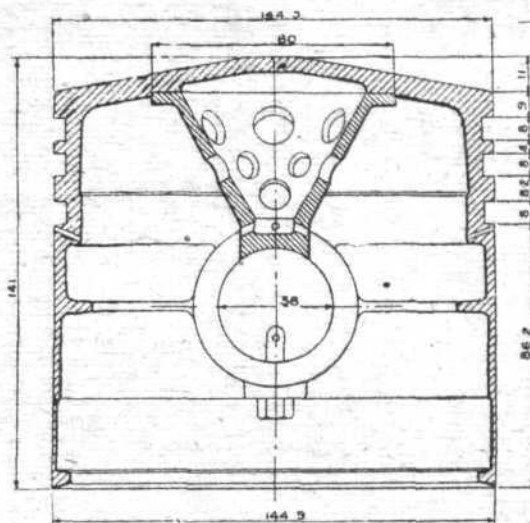


Fig. 4.—Details of 230 h.p. Benz standard cast-iron piston.

the engines fitted with the aluminium pistons, and, as will be seen in the detailed drawing of the cast-iron Benz piston, which is given in Fig. 4 for reference, the distance between the top of the piston and the central axis of the gudgeon pin is increased from 70 mm. to 71 mm., which gives approximately 16.51 cubic cm. less in the clearance volume of each cylinder in engines fitted with these aluminium pistons, which gives a compression ratio of 5 to 1 instead of 4.94 to 1.

Air Council Cannot Lend Aeroplanes.

THE Air Ministry receives numerous applications for the loan of aircraft in connection with movements for raising funds for charitable purposes and in connection with the collection of funds for providing aeroplanes for service with the Royal Air Force.

The number of these applications is, however, so large that the Air Council, whilst in full sympathy with the charitable and patriotic enterprises concerned, have found themselves obliged to refuse the loan of machines for exhibition or permission for the visits of aeroplanes.

The Air Council have reached this decision reluctantly, but the exigencies of the Service leave no option.

In reply to numerous enquiries it is also desired to state that in cases where aeroplanes have been subscribed for and named after a particular locality, or body of persons, it will be impossible to record and maintain a history of the career in the Service of the particular machine subscribed for.

R.A.F. Matron-in-Chief.

MISS JOLLEY, Associate of the Royal Red Cross, is stated by the *Nursing Mirror* to have been appointed Matron-in-Chief of the Air Service.

British Machine in Holland.

THE *Telegraaf* reports that a British biplane was forced to land near Breskens (close to Flushing) on the evening of June 29th owing to engine trouble. The occupants, Lieut. Locker and Gunner Burgois, are both unhurt and will be interned in Holland. They had flown from an aerodrome in France, and had dropped bombs near Bruges.

An American Aerial Ambulance.

ACCORDING to a despatch from Dallas, Texas, a hospital aeroplane is the latest innovation in the American Aviation Service. It is an emergency aircraft manned by a skilled pilot, with a physician in the observer's seat, and it is kept ready during all hours of flying practice to enable medical help to reach a fallen aviator.

Good Work of American Flyers.

"The excellent work of the American flying services continues to excite the admiration and encourage the hopes of every one here," writes the *Morning Post* correspondent with the American Army. "Their flying force grows daily. As pilots and observers, the Americans have already demonstrated that in audacity, individual initiative, and courage they are surpassed by none. Since the middle of April

the American chasers have brought down 27 German aeroplanes at the cost of less than half that number. Of the 27 Lieut. Douglas Campbell and Eddie Rickenbacker, the racing cyclist, have definitely brought down five each.

"A few days ago four chasing machines were sent out to escort home three reconnaissance aeroplanes. When the pursuers were ten miles over the German lines they found the reconnaissance machines being attacked by certainly not fewer than eight Albatros machines. The Americans gave battle, and in a few minutes three of the enemy machines had fallen out of control. The Americans lost one man, who, according to a note dropped over the lines yesterday by a German airman, is a prisoner in Germany, but they won a notable victory. In another case one pilot scattered four enemy machines."

Abortive Raid on Brindisi.

A MESSAGE from Rome says that during a recent Austrian air raid upon Brindisi two enemy planes were brought down, one being captured. Several bombs were dropped, but no damage was done. The enemy flew over in three squadrons at half-hour intervals.

Germany Looking Ahead.

UNDER the auspices of the German Air Forces, working in conjunction with the aircraft industry, the first of a large series of industrial schools to train apprentices and artisans for aeroplane production has been established at Augsburg, Bavaria.

German Aviators in Denmark.

THE Danish Government, on June 24th, released the four Germans who landed in Danish territory. It appears that the flight was prepared for several months ago and three attempts were made before they got away from Neu Ruppin, Prussia. The German aeroplanes will be handed over to the military authorities in the same manner as all other material belonging to the belligerent Powers which has entered Danish territory since the outbreak of war.

Major Baracca's Fate.

AFTER considerable difficulty two Italian flying officers succeeded in recovering the body of Major Baracca, the famous Italian aviator, who had brought down 34 enemy machines and whose death was recorded in our last issue. He has apparently shot himself as there was a wound in his head and a revolver near his hand. He had said that he would prefer suicide to falling alive into the hands of the enemy.

AIRISMS FROM THE FOUR WINDS.

It is all to the credit of Parisians the way in which they are keeping their heads over the double strafing which they are having to endure—of Big Bertha and the almost nightly visitations of bombing Gothas. There is no more outcry there than there has been in London. Without much doubt though, by now, that feeling of jealousy of London has been modified, which was some months ago expressed in the French Press by reason of the Huns' bombing raid neglect of Paris in favour of London. Possibly the gentle germs, with the knowledge of the coming of Big Bertha up their sleeves, deemed that prospective strafing sufficient. But they had not then sampled the increasingly up-to-date anti-aircraft methods employed on these shores. No doubt a sudden switch over to London again, as an element of surprise, may be shortly anticipated, but we fancy most of those very bloated eggs in keeping for strafing the Metropolis will have to be layed astray, as it is easier to make a run for it on the home track by wasting ammunition than taking over much risk with 20 cwt. or so still aboard.

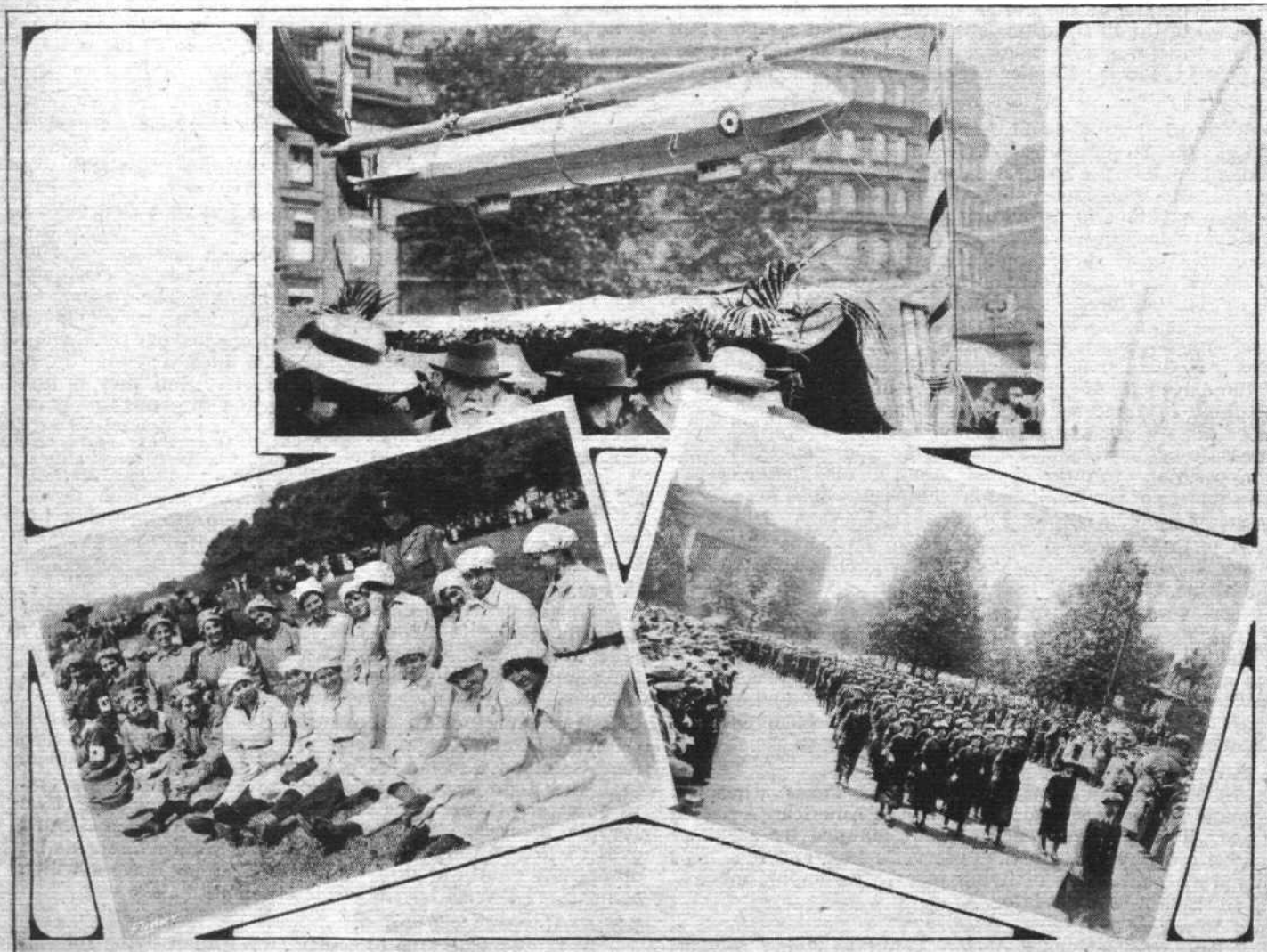
THE good thing the bombing of Paris is bringing about is the sharpening of the French palate for reprisals in kind. According to the *Petit Journal* the aviation group of the Chamber, under the presidency of M. Painlevé, is already moving in this direction. The group will shortly interview

M. Clemenceau, and discuss with the premier the question of chasing the Gothas which come to bombard the capital, the establishment of a distinct zone of action for guns and for aeroplanes, the creation of a zone of small balloons several kilometres in extend, and, finally, the question of the establishment of a luminous zone.

ON their part several of the newspapers open out the question of reprisals against German towns. Lieut.-Col. Rousset vehemently insists that these reprisals should immediately be organised against Treves, Cologne, Coblenz, and Frankfort, which especially, he thinks, ought to be treated as hostages.

That's the sort of spirit to receive these attentions in. With the ever-increasing British expeditions, backed by systematic French retaliation, to be added to presently by wholesale American co-operation in the same direction—well, we should say the German Higher Command will probably be inclined to take an even more benevolent view than before of any officially-backed request by the Allies that bombing outside the war zone may be discontinued forthwith. We don't think!

STUNTING over the House of Lords was, according to the daily Press, a feature of the flight by a couple of pilots on



AT THE TRAFALGAR SQUARE FAIR AND INSPECTION DAY IN HYDE PARK.—At top: the "Zepp." model over the Fair entrance. Below, left: a group of aeroplane workers from Twickenham Training Centre, Buckman Training College and Woolwich Arsenal, in Hyde Park. Bottom right-hand photo.: the "Wrens" on the march to Buckingham Palace.

Sunday last. So long as the river was nice and handy in case of trouble there's not much to be said, but what can justify—if the report be true—stunt flying under town conditions?

"PLANE-POST" in the United States looks like settling down in a business-like way. In the *New York Times* the following suggestive announcement appears regularly:—

THE *New York Times* BY AIRPLANE.

Last or city edition of the *New York Times* will be delivered in Washington, D.C., by
AIRPLANE POSTAL SERVICE
every day at 2.30 p.m.
Price, \$1.70 a copy, post paid.

MANY and varied are the arguments put forward at times by advocates of phonetic spelling. One rather convincing Kaiserly example which may suggest that there is a good deal of truth in this phonetic gadget, after all, is the reference one comes across occasionally to the "All-liest's" sermons on the saintliness of the Huns' war and of their aims.

THAT colour scheme of decoration for hospitals of Mr. H. Kemp Prosser's is gaining fresh adherents. We learn that permission having been given, a ward has been decorated at the Maudsley Neurological Clearing Hospital, R.A.M.C., Denmark Hill, S.E., upon this principle, for shell shock and neurasthenia. The scheme colour, we hear, is also likely to be adopted by the Union of South Africa Public Works Department as an experiment in the Mental Hospital of the Union of South Africa.

THESE rationed days, five Huns before lunch—sounds as if a stronger than a "30 per cent. under" appetiser would be required—would probably go for about 350 coupons, considering that half a pound of ham requires one coupon. But according to a recent report from General Salmon, which Sir William Weir quoted last week at the Royal Aeronautical Society's meeting, one of our pilots, who had been taken away from the Front for duties at home, and was very far from pleased at being withdrawn, got this little bunch of German goods without parting with even one coupon. The record of this straffer's morning's work before he left France was:—

"Major —. Left the aerodrome at 9.40 a.m., when the rain had ceased for a time. He met five scouts and a two-seater east of — at 9.58 a.m. He shot down two of the scouts, which crashed definitely. He chased two more scouts and they collided and both broke up and crashed. He then attacked a two-seater and shot it down in flames. The fifth scout escaped. He returned to the aerodrome and left for England at 11 o'clock in the morning."

AND yet they say decent pig-meat is scarcer than ever!

CERTAINLY not the least entertaining portion of the film shown at the Scala Theatre on Sunday was that in which a split pin levitated itself, described a graceful curve into its hole and when "home" proceeded to stretch its legs. No wonder a tired mechanic near us yawned.

THE new instructional film, however, with the explanatory lecture by Sec. Lieut. Shadwell Clarke, R.A.F., was undoubtedly a great success, as was the special matinee in the programme of which it was an item, and the R.A.F. Families Relief Fund should be appreciably augmented by the effort. In the film a B.E. machine was first shown in various positions, the various component parts being pointed out. The machine was then shown in skeleton form, and the various parts described, each part vanishing as dealt with until only the bare fuselage remained. A "moving" diagram of the fuselage was then constructed, part by part, commencing with the engine bearers, top longerons, bottom longerons, struts, &c., the various fittings being shown in detail where necessary; and when the fuselage diagram was completed it changed "before one's eyes" into the real full-sized thing. Then the machine began to "put itself together" part by part until the complete skeleton biplane was formed, various fittings and parts again being shown in detail. How the controls act was also shown by means of a man-worked control connected up with a large model B.E., which took up the various attitudes as the "pilot" moved the controls. It was all quite interesting, and should prove of considerable value in the training of cadets.

† This is about the best comment we have heard yet on our notoriously varied climate. A young Australian now training at one of our air-stations was asked what he thought of the

English summer. "Well, not bad," said he, "only it rained both days."

WE thought it would come, and it has. "An American Ace," a melodrama in four acts and twelve scenes, is playing to packed houses at the Casino, New York City.

The first act opens well; pistols bark, machine guns rattle, Jack Johnsons roar convincingly, and the tyre of the Red Cross ambulance car blows out. Clods of earth are hurled across the footlights, walls crumble, filling the auditorium with brick-dust, and patriotism is generally rampant.

The plot really doesn't matter; we are concerned, not with the hero (a converted pacifist), the Belgian heroine, or the spying villainess, but with the third act, which features an aeroplane encounter in the clouds. The audience looks down upon an earth painted like a war map, "through clouds in the similitude of an avenue of doughnuts," beneath which planes looped the loop on wires!

At the end on exultant American Army drives a platoon of Huns into the wings. The staid American critic, a student of Ibsen, who wrote the description from which we draw the warring, must have enjoyed his evening immensely.

A DISREPUTABLE journalist friend of ours was prowling round the vicinity of Fleet Street one day when he came on the offices of a boys' paper, "Snips," or something of the kind. Having absolutely no business there, of course he went in. He found a small alert editor with a large pair of shears addressing winged words to certain compositors in connection with the setting up of this week's instalment of "John Storm: The Aeroplane Cracksman." The visitor asked to be allowed to peruse this thriller. He thought he had never read such emulsion, and may have said so, for he was a tactless man. The editor took him sternly to task, and explained that mere fine writing was no good for his job, at which Henry James would have failed miserably. He gave dizzy figures of the thousands of words he personally dictated to a typist, described how you went on and on with your serial until one day you got a wire from your owners telling you to dry up, when you drowned, burned, married or otherwise disastrously disposed of your characters, and ended by flatly challenging the journalist to do anything as good as what they were getting. The latter took him up at once, informed him that he would send him some stuff that would paralyse the motion of all London's errand boys for an hour next week. A little later his typewriter was slapping like a Maxim.

The hero's machine was a nightmare creation, and he always flew it in immaculate evening dress. (This was so that he could pass as a guest at the houses he robbed.) The engine "spun noiseless as a ball-bearing roller skate wheel." Its pilot, smoking expensive Egyptian cigarettes, alighted on the lawn of a country mansion, relieved the guests of their valuables (while always showing to the ladies the deference that tradition exacts of his order), and returned with the swag, not a single sleek hair ruffled.

The journalist got a fat cheque for this horror, but Art was ever its own reward, and I think the glowing approval of the morning milk-boy was more to him.

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister journal) of June, 1908. "FLIGHT" was founded at the latter end of 1908.

THE PELTERIE AEROPLANE.

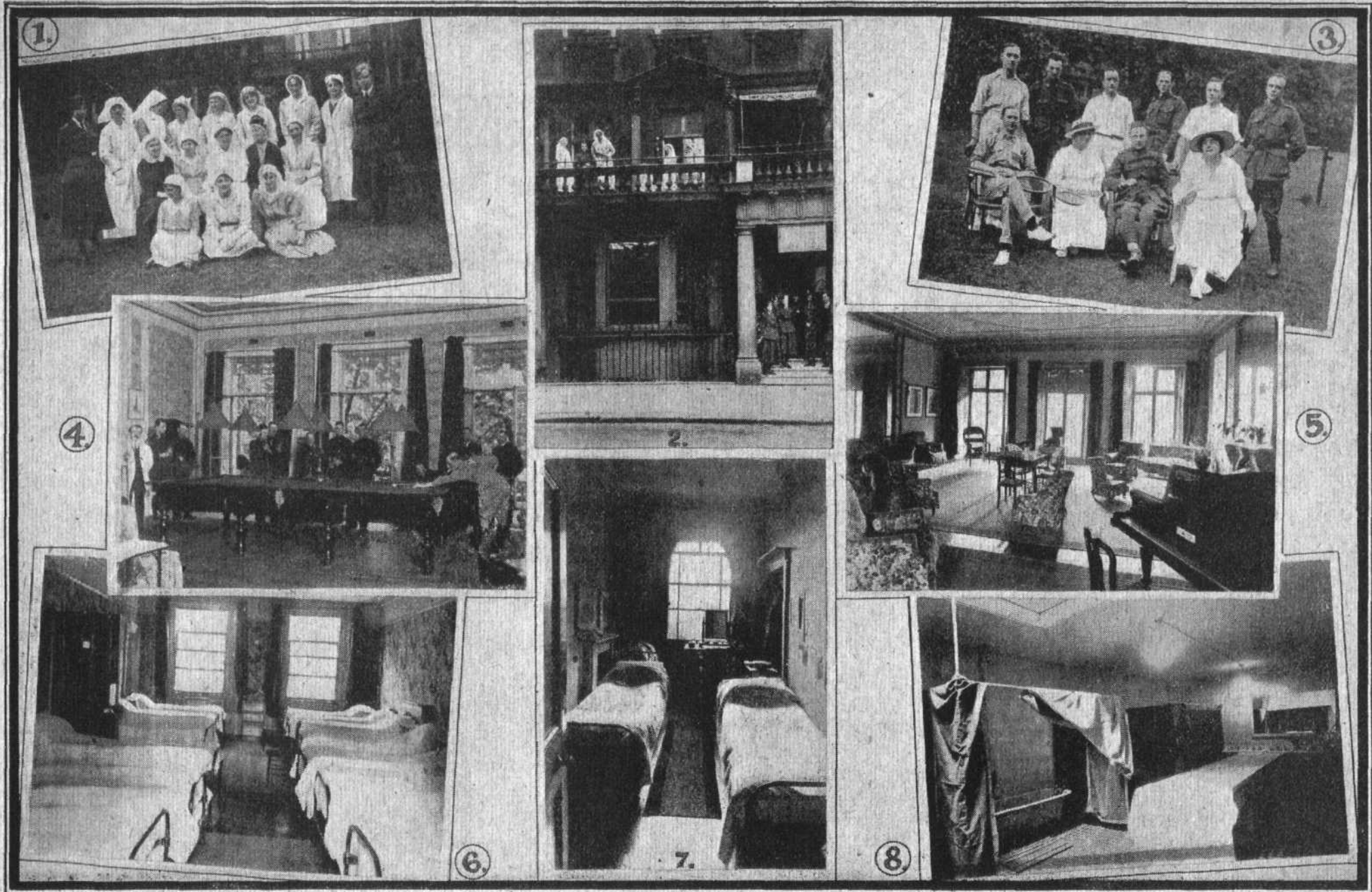
On Whit Monday M. Pelterie, whose very interesting aëria motor we described in the *Automotor Journal* of November 2nd and 30th, 1907, achieved a flight of some 1,300 yards on his aeroplane. A feature of the machine is that it is of the monoplane type, having only one surface, and a peculiarity of the flight performed with it on Monday was that it took place at an altitude of about 120 ft. from the ground.

M. DELAGRANGE FLIES OVER TEN MILES.

M. Delagrance has continued his short flights at Milan, making flights of nearly up to 3 kiloms. at a time until Monday last, when he capped all previous performances and created a new world's record by flying, at a height of from 10 to 20 ft., a distance of 17 kiloms. in 16½ mins. on the Piazza d'Armi.

THE NEW ZEPPELIN.

On Saturday evening last a preliminary ascent was made by Count Zeppelin's new airship, which, if it successfully fulfils the various conditions, particularly that of landing at will on *terra firma* instead of as hitherto on the surface of a lake, will be taken over by the German Government for military purposes at the price of £100,000. The experimental manoeuvres were of a satisfactory character, the vessel remaining in the air some 45 minutes.



THE CHEVRONS CLUB.—1. A group of voluntary lady workers at the Club. 2. The entrance from St. George's Square. 3. A tennis group. 4. The billiard room. 5. The lounge. 6. One of the dormitories. 7. A bedroom. 8. Bathroom and lavatory.
(See page 749.)

THE CHEVRONS CLUB.

THE tremendous expansion of the fighting Services, consequent upon the war, has made manifest a great many needs, and particularly those connected with the well-being and comfort of our fighting men. One of those needs, and by no means the most inconsiderable of them all, has been that of comfortable quarters where men on leave can be sure of being able to secure the comforts of home at a reasonable cost.

To fill the gap there have been established numerous clubs, especially in London, where all ranks of the new armies and the Navy can find decent accommodation at a cost within the limits of their means. We have said all ranks, but it would have been more correct to say all ranks with the exception of the warrant and non-commissioned officers of the Army, Navy and Air Force. Of officers' clubs there are many, quite apart from the older Service clubs; while so far as the rank and file are concerned private enterprise has provided numerous clubs and hostels where comfort at a moderate price is the rule. But until quite recently no one appeared to realise the existence of the warrant and non-commissioned officers of His Majesty's fighting Services, and nothing had been done for them. True, they were free to make use of the institutions provided for the men, but it seemed to have escaped attention that the same questions of discipline obtain within the four walls of a club as in ships and barracks, and that, therefore, warrant and non-com-

missioned officers who elected to make use of them did so under a marked disability.

The initial difficulty has now been got rid of by the institution of the Chevrons Club, which is open to warrant officers, petty officers and non-commissioned officers of the Navy, Army and Air Force. It is under the most excellent auspices. His Majesty the King is Patron of the Club. The joint Presidents are Field-Marshal Lord French, Admiral Sir Rosslyn Wemyss and Major-General Sykes. Excellent premises have been opened in St. George's Square, close to Victoria Station, with a large number of comfortable bedrooms and recreation rooms, while there are tennis courts available, and arrangements have been made with the committee of Lord's for the cricketing members and visitors of the Club to play on the St. John's Wood ground without any payment beyond the ordinary membership subscription to the Chevrons Club, and as that is the purely nominal one of five shillings a year it is clear that membership carries a good many advantages for a very small payment. Undoubtedly the Club will fill a very pronounced gap in the arrangements for men on leave in London. It has already become a popular institution among warrant and non-commissioned officers of all three Services, and will undoubtedly become more so as its existence and scope become better known, to which end on page 748 appear some photographs of the Club-rooms, &c.

SOME OUTSTANDING PROBLEMS IN AERONAUTICS.

By Dr. DURAND.

(Continued from page 714.)

Variable Wing Area or Variable Wing Chamber.

To mention only one of the many remaining problems which are connected with the design and construction of the aeroplane itself, a word may be said with regard to the problem of variable wing area. Broadly speaking, the ideal aeroplane should be able to change its wing area in accordance with the conditions and circumstances of flight. For ease in getting off the ground at a moderate speed, for ease in landing likewise at a moderate or low speed, there is need of a relatively large area of wing or supporting surface. For the attainment of high speed, reduced wing areas are needed, and are furthermore sufficient for the support of the weight at such high speeds. The supporting force gained by a given form of aeroplane wing depends on the area, the speed and the angle of attack, and there will be some combination best for each set of conditions. To meet these conditions, varying from time to time throughout the course of a flight, a correlative variation in wing area is needed. To some extent the same ends may be met by changing the camber or curvature and form of the fore and aft section of the wing. Thus, when the camber or fore and aft curvature is increased, the form will be more suitable for landing at a reduced speed, while with curve flattened and camber reduced, the form will more readily favour the attainment of relatively high speed. The problem of an adjustable wing, either as to extent of area or camber or both, is a favourite one with students of aeronautics and we may hope for some measure of useful and practical solution. Thus far, of the many devices and forms proposed, none has so far fully justified itself as an altogether satisfactory and practical solution of the problem.

Motive Power.

Passing now to the motive power and its application to the propulsion of the aeroplane, a most interesting and important series of problems challenges our attention. Only the more important can be noted here.

Fuel.

One of the most important of these is that of fuel. What is to be the future fuel for the aeroplane, or for aerial navigation in its wider aspects? How long will our stores of crude petroleum oil from which we now obtain our petrol or essence or gasoline, as it is variously termed, continue to furnish this all-important element in the present programme of power development? Doubtless there are large stores of petroleum oils yet undiscovered, but we may safely assume that we are using up a supply in the nature of a bank deposit. We are using our principal and not living on the interest. So far as we know, nature is not now engaged in making for us petroleum oils, certainly not in any proportion to our rate of expenditure. To such a general programme of consumption, there is, of course, but one end, ultimate exhaustion. This is, of course, only one phase of the overshadowing menace which the modern social and industrial world must face some time when our present supply of carbon and hydrocarbon fuels begins to become exhausted, unless indeed we develop or

discover in the meantime some other source of energy which will adequately take their place. This is perhaps a question which need not seriously concern the present generation, but when we take a long look ahead—a look for example as that covered by the development of Europe from the days of the Cæsars or even from the time of, say, Galileo—we may realise with startling emphasis the need of foresight with regard to a source of energy adequate to the world's demands. Various ages have been designated as of stone, bronze, &c. The present might well be designated as that of natural energy. Our entire civilisation, in a material sense, rests upon the utilisation of sources of natural energy which are not inexhaustible, and which are, in fact, becoming exhausted, in some cases, with menacing rapidity. In the meantime we must, and presumably we shall, make some shift to tap efficiently other sources now known, or we may haply discover sources which to-day lie beyond our present vision.

A long look ahead for aerial navigation therefore shows that if the present line of development is to continue, there will be a serious problem to be met sometime, and that perhaps before many decades—the problem of a fuel suited to the needs of aeronautic prime movers, at a time, when present petroleum sources will no longer yield the supply which we now accept and use with so little thought for the morrow. But with regard to the question of fuels, we need not go so far afield as to look into the coming decades for interesting and important problems. Perhaps the one most pressing for present solution is the question of what is the best fuel for the modern aviation engine, having in view the three requirements—power economy, with reliability and durability. Out of the exigencies of the present war have come many serious and extended researches relating to the problems of military aviation, and of these none is perhaps of greater significance regarding the future of commercial aviation than the studies which have been made regarding aviation fuels. While matters relating to the problems of military aeronautics must be spoken of with much reserve, it will perhaps be permissible to say before this audience that from these studies three principal results seem to have been rather definitely established. These are:— (a) As between the various grades of aviation motor fuels which have been used during recent years, and comprising a rather wide range of composition and of physical and technical characteristics, there is but little to choose from the standpoint of power or economy alone. This assumes, of course, that the fuel is a genuine motor fuel and the results regarding power or economy relate to an assumed period of effective operation under such fuel. It must not, however, be assumed that there are no differences in power or economy traceable to the fuel employed, for such is far from being the case. It is, however, within the limits of reasonable statement to say that such differences are relatively small, and under most circumstances would not, of themselves, constitute a determining or controlling factor. (b) As between such motor fuels marked differences do seem to be indicated as regards their influence on the life and reliability of the motor, especially on long time

tests, or in actual service on long time flights. (c) For the various fuels, in order to realise the best results either as regards power, economy, or life and reliability, special and individual carburettor adjustments are necessary, and such as can only be determined by trial under actual working conditions.

It may perhaps be further said that the problem of an excellent and reliable motor fuel for aviation purposes seems to have been satisfactorily solved. Its specifications and range of characteristics, physical and chemical, are pretty well established, and so long as our source of motor fuel supply is to be found in petroleum derivatives, we seem to have reached a reasonably satisfactory determination of the best combinations of such derivatives for the various requirements of aviation service. These characteristics, which must be considered as a part of the great body of military information and which cannot for the moment be put down in plain print, we may hope will, in due time, become available in the arts of peace and for the development of commercial aviation in its various fields of promise. With the problem of fuel, that of the prime mover or engine is closely related. Is the present type of engine to continue, or is it only a passing stage on the way to some more perfect form? This is a question, interesting indeed for speculation, but hardly to be considered in comparison with actual present moment problems. The present engine and its application to the propulsion of the aeroplane does, furthermore, present no lack of interesting and important problems, and among these a few of the more pressing may here be noted. First, the problem of gross power. How much power can we put in an aeroplane or airship of no matter what type or form? This divides immediately into three subsidiary problems as follows:—(1) How much power from a single cylinder? (2) How many cylinders for a single engine? (3) How many engines for a single airship? In the way of power per cylinder we are now reaching close about 40 h.p. as a maximum. In the way of cylinders per engine we have reached a stage of development where the 12-cylinder engine is quite a standard type and higher numbers such as 16 and 18 represent only questions of detail. It is not too much to say that the 600 h.p. engine is quite within the reach of present practice and may be realised as called for. We have long since become accustomed to two and three engines on a single plane, and are now seeing four engines in various recent designs. It is therefore clear that if a power plant of 2,500 h.p. on a single structure is wanted, it is quite within the scope of present practice to realise and provide such a plant. And if four engines of 500 or 600 h.p. each, there is no reason why the number may not be increased, at least to a point beyond the present apparent need for power on a single structure. On the other hand, it must be admitted that, having in view the limitations of present practice, the most simple and in fact the only reliable way of extending power is by a multiplication of the number of cylinders rather than by an increase in the size of the latter. The fact that a 2,000 h.p. equipment would presumably require from 40 to 60 cylinders shows the formidable degree of multiplication of small elements required to realise such a result. The real problem of size or capacity of engine is therefore one of power in a single cylinder. What can be expected in this direction, and in what way shall search be directed? The present limitation arises largely as a matter of cooling, and it is in this direction that search may well be made for ways and means of effectively increasing the power capacity of a single cylinder in an engine of the aviation type. This is a problem which is distinctly outstanding and well worth our serious attention and study.

The Carburettor.

Another problem connected with the engine is that of the carburettor. At the start of aeronautic engineering the carburettor naturally took its initial form and arrangement from the already fairly well developed automobile engine carburettor. This was but natural, since both engines are of the same type and both use the same general form of fuel. In respect of the conditions of operation, however, there is a marked and important difference. The automobile operates at or near a fixed level, and hence in an atmospheric medium of sensibly fixed pressure and density. With the aeroplane the case is very different. The latter may change its level by thousands of feet in a few minutes or even seconds, as in vertical or nearly vertical dives, rapid spirals, &c. This difference in the conditions of operation introduces a factor of distinct significance and of great importance in the design and disposition of the carburettor. Experience in the air has clearly shown the importance of this new factor, and it is not too much to say that the problem of the entirely satisfactory carburettor, capable of automatically answering to the various atmospheric conditions under which it must work,

is distinctly an outstanding problem. It is true that much progress has been made, and as the result of laboratory research, checked by actual experience in the air, we now know much better than, say, two years ago, the fundamental conditions which must be met by the carburettor for the aeronautic engine. The present solution can hardly be considered as final, however, and we may fairly admit that the whole problem of carburation, including the manifold supply of the carburetted mixture to a multi-cylinder engine, should, as soon as may be, receive a thorough and fundamental re-study in the light of the information to be drawn from the experience of the past three or four years.

Ignition.

Another problem which we should view as outstanding is that of ignition. It is true that ignition, as now realised with the best equipment, seems to be fairly reliable and effective. But the whole programme is open to the objection of requiring an entire electric power plant of a highly specialised type, together with electric conductors and the spark plug for producing the spark between the discharge points within the cylinder. This ensemble, comprising electric generator or magneto, electric cable, distributor for sending the spark with proper timing to the various cylinders and spark plug with discharge points within the cylinder, represents a very complicated and highly specialised device for producing the initial ignition within the body of compressed fuel mixture. In its present state it is a marvel of scientific and technical development, and it does its work; but it is complicated and subject to many possible modes of derangement, and, as we all know, has been and is still the seat of some of the most serious of the engine difficulties to which the power plant as a whole is subject.

I have never been able to persuade myself that this exceedingly complicated and specialised auxiliary equipment was to be the final solution of the problem of producing ignition in an internal combustion engine. If we can anticipate the explosion engine of the year 1968, assuming that our grandchildren are still dependent on hydrocarbon fuels at that date (and furthermore that they are still available), it would seem as though some more direct and simple mode of initiating the combustion in the cylinders would have been found. Still, otherwise, we may say that on the law of probability, the chances are overwhelmingly against our having at the present moment developed the very best method of ignition. The laws of physics and chemistry, by a probability which almost reaches certainty, contain some potential combination of factors which will permit of eliminating much of the complexity and delicacy of adjustment which is so characteristic a feature of the present mode.

It is perhaps proper to add here that studies in this direction have already been made, and with results which offer promise of interesting developments in the future. The path of perfection is likely to be not a short one, however, and we can see no prospect of any development in the to-morrow of progress likely to displace electric ignition. There must, however, be some better way, and if not to-morrow, then some other morrow should see it made available for use. The problem of ignition is then one which is distinctly outstanding, one which by its importance merits the most careful study, and one which at least offers reasonable ground for hope of a successful and relatively simple substitute for the present mode.

Maintenance of Power at Altitude.

We come now to a problem of the very highest present and future importance, that of maintaining the power of the engine at high altitude. The situation as it develops in the case of an aeroplane mounting to higher and higher levels in the atmosphere is readily appreciated with a moment's thought. The power of the engine arises from the combustion of vaporised hydrocarbon fuel. The power per cycle for a given cylinder will, therefore, to a first approximation and assuming a sensibly constant efficiency of thermodynamic transformation, vary directly with the weight of the fuel which can be burned per cycle. But this in turn depends upon and is conditioned by the amount of oxygen which can be drawn into the cylinder per intake stroke of the cycle. But the oxygen is brought in as one of the constituents of the atmosphere, and hence the amount of oxygen available per intake stroke will depend upon and be directly proportioned to the amount of air which can be drawn in. But in terms of volume, just a cylinder full, or, more exactly, just the volume represented by the piston displacement in moving from one end of the stroke to the other, can be brought in. Hence, we may at least depend on what we may term a cylinder volume of air no matter where we are. But just here arises the trouble. The actual weight of air depends conjointly on the volume and on the density, and unfortunately for the aeronautic engine, at least,

the density of the atmosphere decreases steadily with altitude, so that at 15,000 ft., for example, the density is only about 60 per cent. of the normal density at the earth's surface. It is clear then that an aeronautic engine, other things equal, will draw in, per intake stroke, only about 60 per cent. of the weight of air at this altitude as compared with the indraft at the earth's surface. Hence, it will be able to burn only 60 per cent. of the fuel, and hence with equal efficiency will develop only 60 per cent. of the power.

But here we must stop for a moment and enquire as to the effect of such reduction of power on the speed of the aeroplane. We know that, other things equal, the resistance of an aeroplane to propulsion through the air at uniform speed varies directly with the density of the medium. Hence, at the same speed as near the surface of the earth and with the same attitude or angle of attack, the aeroplane at 15,000 ft. elevation would experience only 60 per cent. of the resistance, and would hence require only 60 per cent. of the thrust, and hence at constant revolutions of the propeller would require only 60 per cent. of the power from the engine. Hence, it appears at first sight as though we had lost nothing in speed by the reduction of the power of the engine. If the latter has been reduced to 60 per cent. of its amount at low levels, so has the resistance and power required, so that the speed realised should remain the same.

Such would, indeed, be the case if this were all of the story; but, unfortunately, other considerations enter, and the simple relation of uniform speed at varying altitudes cannot, as a matter of fact, be realised without compensating features.

Thus, if at a constant speed and constant angle of attack for the wings, the resistance to propulsion is only 60 per cent. as great at the altitude of 15,000 ft. as on the ground, it is, unfortunately, the same for the lifting force developed by the wings. This also is only 60 per cent. as great, while the weight of the machine remains sensibly constant at all altitudes. Let us pause long enough to grasp clearly this fact, that while, at constant speed and attitude of flight, the resistance, the lift and all other aerodynamic forces involved vary directly with the density of the air, and hence decrease with the altitude, the weight of the machine, and hence the lift necessary for support, remain sensibly unchanged. Hence, at the same attitude of flight the lifting forces at altitude and under the same speed will no longer support the plane, and unless something is done, it would be unable to maintain horizontal flight at such altitude.

Two courses are then open for consideration as follows:—(1) We may seek to increase the speed until at such increased value the lift will equal the weight of the plane. Under the conditions assumed, this would involve an increase of speed of about 30 per cent., thus increasing the resistance to propulsion by nearly 70 per cent. or bringing it back to its value at low altitude. But this resistance overcome at the increased speed would mean an increase in the required horse-power of 30 per cent. as compared with that normally developed at low level, while with the actual indraft of air and even allowing for the increased speed, only some 78 per cent. of this, or 60 per cent. of the needful amount, would be developed. Hence, no such speed could be realised, and the support of the unvarying weight in the rarefied air cannot be realised in this manner, and must be sought otherwise. (2) Instead of seeking for the necessary lift by increased speed we may seek it by changing the angle of attack; by changing the flying attitude of the plane so that at the same speed, for example, the lifting force will be greatly increased. In this manner the needful lifting force may indeed be realised. But unfortunately with the increase in lifting force will come also an increase in head resistance, not proportionally, but still a definite increase. This will mean that the actual resistance at, say, 15,000 ft. elevation will be greater than 60 per cent. of that at low elevation, and hence with 60 per cent. of the power available per cycle, the original number of revolutions cannot be maintained and a reduction in speed will result. With this reduction in speed will come a further loss in lifting effect and need for a further change in the angle of attack with increased head resistance; until finally, at some reduced speed, a condition will be found where the needful support for the weight of plane may be realised and the resistance to propulsion can be met by the thrust or pull developed at the propeller. Under these conditions, horizontal flight again becomes possible, but at a speed somewhat below that corresponding to low altitude conditions.

But this is not all of the story. In addition we must reckon on a diminished efficiency of the engine with decreased power, and with the probability of a loss in propeller efficiency with the resultant change in speed. Thus, if an engine is primarily designed to work at its best efficiency and under its best conditions at or near full atmospheric pressure and density, it

will not work with equally good efficiency at high altitudes in rarefied air and when developing only about one half the power for which it is primarily designed. All of this means, in brief, then, that at an altitude of say 15,000 ft. the plane must fly at a less advantageous angle of attack and hence with more resistance, and that the engine will be able to burn only about 60 per cent. as much fuel and will transform the resulting heat less effectively than when at low altitudes. Hence, the power developed will be less than 60 per cent., and, hence, insufficient to maintain the same speed; and with diminishing speed there may be further loss of efficiency in the propeller and a further loss of speed, until finally matters become adjusted at some value usually definitely and sometimes considerably less than that corresponding to low level conditions. Hence, as an over-all practical result an aeroplane normally loses horizontal speed as it ascends to higher altitudes. Confronted with this fundamental fact, what is to be done? Such loss of speed, especially in a military sense, is or may become very serious, and one of the large and definitely outstanding problems in aeronautic engineering at the present time centres about the possible ways and means of meeting this condition. The obvious proximate solution is to avoid, so far as may be, the decrease in the amount of air handled per intake stroke of the piston as the plane ascends to higher and higher altitudes.

Broadly, two courses are open. First, we may definitely and frankly design the plane and engine for a certain desired performance at a given altitude, say 15,000 or 20,000 ft. This is a straightforward problem in aeronautic engineering. Given the desired schedule of operation and the altitude, we can determine the resistance to be overcome and the horse-power required, and can design the engine accordingly. In such case the volume of the cylinders will be suited to the rarefied air in which the engine is to work, and all proportions and details will be worked out on this basis. It will be obvious that such an engine will have much too large a piston displacement volume when at low altitude. That is, it will be over size and over powered relative to the plane. In fact, operation near or on the ground under the same adjustments as at altitude would be quite out of the question. Means must therefore be provided for reproducing, when on the ground or at low altitudes, substantially the operating conditions at high altitudes and low air density; that is the conditions for which the engine was designed. This may be most conveniently done by throttling down the air intake so that while air at or near full sea level density may surround the engine, it will be reduced in pressure at the intake throttle to such a degree that the amount actually taken into the cylinder will only equal that which would normally enter, without throttling, at high altitude.

On the other hand, we may definitely design the engine for operation at or near sea level and with size of cylinders and all proportions and adjustments worked out accordingly, and then by a supplementary device endeavour to maintain or to nearly maintain such conditions within the engine itself even if it is at high altitude and surrounded by air of a lower density. The solution calls for some supplementary form of compressor or equivalent device which shall operate on the rarefied air as a first stage and raise it from the low pressure, characteristic of the altitude, up to or nearly to normal low altitude pressure and density. Each of these alternatives represents a perfectly possible solution. Each has its special advantages and disadvantages. Each has its advocates as a solution of this important problem. The first solution is the simpler of the two, since it involves no special or additional device for compressing the air. It does, however, mean extra weight in the engine which is always there and which will reduce correspondingly the net carrying capacity of the plane. On the other hand, the compressing device of the second solution is not easy to realise satisfactorily, and it also involves extra weight, though presumably less than in the case of the first solution. Again, its operation as a separate or independent unit for realising a preliminary compression of the air is less efficient than to do the whole compression in the engine itself and by the engine piston as in the first solution. Only extended and careful trial will presumably be able to finally decide which is on the whole the better solution of the two.

The reserve necessary with regard to military matters makes it unwise to attempt to give any account on this occasion of just where the matter stands with regard to this problem, but it will at least be safe to note that it is a problem which is attracting much attention and study on the part of the various allied Governments, and that much valuable information is being developed, and on which we may hope that some satisfactory solution may be based.

(To be concluded.)



Casualties.

Lieut. J. AMYAN L. CHAMPNEYS, R.A.F., who was killed in action on June 17th, aged 19, was the second son of Mr and Mrs. Champneys, Otterpolo, Sellindge, Hythe, Kent.

Lieut. SYDNEY W. ELLISON, R.A.F., who was killed in action on the Italian front on June 16th, was a son of the Rev. J. H. Ellison, Carnathan, Kelvin Parade, Belfast, minister of Oldpark Road Moravian Church.

Capt. LOUIS FLEEMING JENKIN, M.C. and bar, R.A.F., who was reported missing on September 11th, 1917, and now officially presumed killed, aged 22, was the second son of the late Austin Fleeming Jenkin, barrister-at-law, of the Inner Temple, and was educated at Dulwich College, where he gained a mathematical scholarship and his colours for cricket and football, and was in the O.T.C. He had entered for Trinity College, Cambridge, but on the outbreak of war he joined the Public Schools Corps, and within a week obtained his commission in the Loyal North Lancashire Regiment. He was badly wounded at Vimy, and on his recovery, joined the Royal Air Force, and went again to France at the beginning of April of last year.

Flight-Com. BERTRAM DENISON KILNER, R.N., who has been missing since September 25th, 1917, and now officially presumed killed on that date, was 22 years old and the second and younger son of Mr. and Mrs. W. A. Kilner, late of Skisdon House, Richmond, and now of 84, Montpelier Road, Brighton. His elder brother is Wing-Com. C. F. Kilner, D.S.O., R.M. He was educated at Eastbourne and Brighton Colleges. He served at Dunkirk and was one of the night flying pilots, and he afterwards served in Gallipoli, from which place he was invalided home. On the day he was missing he flew at 5.30 in the morning, by himself, from the deck of his ship in pursuit of a Zeppelin.

Lieut. JOHN FREDERICK RAYMOND KITCHIN, R.A.F., who was accidentally killed on June 21st, when starting out upon a patrol, was the son of the late Clifford Kitchin and of Mrs. Clifford Kitchin, of Holmwood, Boar's Hill, Oxford. He was educated at Clifton College (preparatory school) and at Briardale, Stoke Bishop, and afterwards privately, with the intention of going up to Oxford. As soon as he was 18 he was given a commission in the R.N.A.S. For the last nine months he had been employed on active service at stations in England.

2nd Lieut. EDMUND O. KROHN, R.A.F., who was reported missing on February 28th, and is now officially reported killed in aerial combat, was the second son of Mr. and Mrs. E. W. Krohn, of Funchal, Madeira, and grandson of the late W. J. Krohn, of London, formerly of Madeira and Petrograd. He was aged 19.

Capt. WILLIAM REGINALD GUY PEARSON, R.A.F., who lost his life on June 20th at a Northern aerodrome owing to a collision in the air, in which Lieuts. McFarlane and Flynn were also killed, was the second son of Dr. and Mrs. Spencer Pearson, of Clapham Road, S.W. He was 21 years of age, and was educated at Ashdown Park and Berkhamsted, where his classical attainments promised a brilliant University career. At the outbreak of war he enlisted in the Empire Battalion, Royal Fusiliers, and later, receiving a commission in the A.S.C., proceeded to France in January, 1915. He very shortly afterwards joined the R.F.C. in France, and acted for several months as an artillery observer. Returning to England, he completed his training as a Scout pilot, and served in France in a fighting squadron for nearly a year, during which time he had over fifty encounters with enemy machines, and was officially credited with having brought down eleven German aeroplanes, many of them two-seaters. He became a flight commander and gained his captaincy, being mentioned in despatches. Capt. Pearson was a flying instructor at the time of his death, and was considered one of the most careful and skilful of pilots.

Lieut. HENRY LIONEL STORRS, R.A.F., who died on June 20th of wounds received on the 15th, was the second son of Mr. H. T. S. Storrs, Headmaster of Shirley House Preparatory School, Old Charlton. He was born in 1898, and educated at his father's school and at Westminster, where he was a King's Scholar. He obtained his colours for rowing, and was a corporal in the school O.T.C. In 1916 he was elected to a Westminster scholarship at Trinity College, Cambridge, but did not go into residence, as he obtained a commission in the R.F.C. in August of that year. He went out to France as an observer in January, 1917, returning in July to train for his pilot's course, becoming a pilot in November, and proceeding to France again in December. He was wounded in a gallant fight with ten enemy aeroplanes on June 15th, and, though seriously wounded, he succeeded in bringing his machine safely back to his aerodrome.

Capt. J. MARCUS TYRRELL, Royal Irish Fusiliers, attached R.A.F., who was killed on active service in France on Thursday, June 20th, was the son of Alderman John Tyrrell, J.P., of Belfast, and the Cairn, Ballyholme, Bangor, County Down. The late Capt. Marcus Tyrrell was 23 years of age. He survived his younger brother only eleven days, Capt. Walter A. Tyrrell, M.C., also of the R.A.F., having been killed in action on the 9th inst. The eldest brother, Lieut.-Col. Wm. Tyrrell, D.S.O., M.G., M.B., R.A.M.C., has been on active service on the western front since the opening of the war.

Lieut. GEOFFREY WILSON, R.A.F., who was reported missing on May 15th, and now reported killed in action, was the younger son of Dr. H. Wilson, J.P., and Mrs. Wilson, of Cheshire, Cheshire. Educated at Aldenham, he returned from Saskatchewan, where he was farming, in October, 1914, enlisted in the A.S.C. (H.T.), and obtained his commission in the following December. After 18 months' active service he transferred to the R.F.C. in France, where he served as an observer for six months, and afterwards became a pilot.

Sec. Lieut. ALAN CARTER, R.A.F., who was accidentally killed on June 25th, while flying abroad, aged 24, was the only son of Herbert and Florence Carter, Feering, Essex.

Lieut. F. L. CATTLE, R.A.F., who was accidentally killed on June 29th while flying abroad, aged 19, was the second son of Mr. and Mrs. Arthur E. Cattle, 69, Ridge Road, Stroud Green, N.

Lieut. H. B. REDLER, M.C., R.A.F., who met his death while flying in Scotland in company with Capt. I. H. D. Henderson, M.C., the only surviving son of General Sir David and Lady Henderson, who was also killed, was 21 years of age, and was the eldest son of Mr. and Mrs. D. B. Redler, of Moorreesburg, South Africa, and formerly of West Honkton. He left South Africa at the end of 1915 to join the R.F.C. in England. He had been to France twice, and won the Military Cross there. He was buried with military honours at West Honkton, near Taunton.

Prisoner of War.

2nd Lieut. R. J. GREGORY, R.A.F., son of Mr. and Mrs. G. H. Gregory, Berwyn, York Avenue, Hove, and The Hawthorns, Burgess Hill, originally reported missing on June 5th, writes to his parents that he is a prisoner of war in Germany, and is well.

Married.

Lieut. W. R. ADKINS, Royal Fusiliers and R.A.F., and Miss M. A. VRENA MAY were married quietly at St. George's Church, Hanover Square, on July 2nd.

Capt. FRANCIS R. ALFORD, M.C., R.A.F., was married on June 29th at St. James's Church, Piccadilly, to ROSALIE FRANCESCA, daughter of Mr. and Mrs. TANKERVILLE CHAMBERLAYNE, of Cranbury Park, Hants.

Capt. CLAUDE MASHITER ALPORT, the Black Watch, attached R.A.F., younger son of the late Mr. Lawrence

Alport and of Mrs. Alport, 148a, Sloane Street, S.W., was married on June 26th at St. Mary's, Warbleton, Sussex, to VIOLET, only child of Mr. and Mrs. LESLIE CHARLES WINTLE, "Lantao," Eastbourne.

Sec. Lieut. P. H. BENSON, R.A.F., eldest son of Mr. and Mrs. Benson, of Streatham, was married on June 27th at St. Agnes' Church, Moseley, Birmingham, to BESSIE, daughter of the late Mr. and Mrs. HOPKIN, of Wolverhampton and Birmingham.

Maj. H. GORDON DEAN, York and Lancaster Regt., attached R.A.F., was married on June 17th at St. Ninian's, Hampstead, to HELEN McNEILL, daughter of the Rev. John McNeill, of Hampstead, and Denver, U.S.A.

Lieut. GILBERT KAY, R.F.C., was married on June 23rd, at the West London Synagogue, to THEODORA, youngest daughter of the late JULIUS FRANK and of Mrs. Frank, of 2, Glenshaw Mansions, Priory Road, London, N.W.

Lieut. CEDRIC VINCENT KELWAY, R.G.A., attached R.A.F., was married on June 25th at the Parish Church, Great Yarmouth, to BARBARA, daughter of JOHN C. MILES, J.P., The Denes, Great Yarmouth.

Lieut. NORMAN L. MOON, Hussars (S.R.), attached R.A.F., was married on July 3rd at Christ Church, Lancaster Gate, W., to Miss MARY F. ROBERTSON.

Maj. F. J. S. MURRAY, Canadian Infantry, attached R.A.F., was recently married to ETHEL M. LEIGH, widow of Bernard H. Leigh, Royal Berkshire Regiment, only child of Col. and Mrs. Pelly, Houghton Manor, Huntingdon.

Sec. Lieut. GORDON CECIL PAGE, R.A.F., was married on July 1st at St. Saviour's Church, Warwick Avenue, Maida Vale, to Mrs. MYRA A. FAWCETT.

Capt. VICTOR A. WATSON, R.A.F., was married on June 27th at the Parish Church, Henley-on-Thames, to ETHEL MARY, elder daughter of Mr. and Mrs. LIONEL A. CRICHTON, Drayton, Henley.

Maj. JOHN BALLINGALL FORBES WATSON, R.A.F., younger son of the late John Watson and Mrs. Watson, of Burnbank, Milnathort, Scotland, was married on June 29th at St. Martin's in the Fields, to ALEXANDRA MARY GEORGIE, only daughter of Canon and Mrs. DALTON, of the Cloisters, Windsor Castle.

To be Married.

The marriage of Capt. NORMAN NOWELL, R.A.F., only son of H. M. Nowell, of Norton-on-Tees, and JOYCE, daughter of Mr. and Mrs. FREDERICK HEWETT, of Hythe, near Southampton, will take place at St. Martin's-in-the-Fields, Trafalgar Square, on July 18th, at 12.45.

Items.

Princess Louise, Duchess of Argyll, was represented by Col. Vernon Chater at the memorial service held on June 27th at St. Martin's-in-the-Fields, Trafalgar Square, for Capt. Ian Henry David Henderson, M.C., Argyll and Sutherland Highlanders and R.A.F., only son of Lieut.-Gen. Sir David and Lady Henderson, who was killed while flying on June 21st.

The will of Capt. DOUGLAS STEWART KENNEDY, M.C., R.F.C., killed in action, has been proved at £2,448.



AVIATION IN PARLIAMENT.

R.A.F. Aerodromes in Lancashire.

MR. MALLALIEU in the House of Commons on June 24th asked the Under-Secretary of State for the Air Ministry if his attention has been called to the wasteful expenditure incurred in the construction of aerodromes in a district in Lancashire; that this waste is having a prejudicial effect upon national war savings efforts in that part of the country; that as a consequence two local war savings committees have refused to organise a special war weapons' week, alleging that it would be useless to appeal to the public in view of the existing conditions which prevail; and whether he proposes to take any action in the matter?

The Parliamentary Secretary to the Air Ministry (Major Baird): There have been several allegations of wasteful expenditure at the works which my hon. friend has in mind. The Administrator of Works and Buildings has investigated the case closely, and I understand that though at the outset the labour available was not fully utilised, for reasons beyond control, matters are now as satisfactory as can be expected in present conditions. No information is available to support the suggestion in the latter part of the question.

Mr. Billing: Having regard to the fact that various instances of wasteful expenditure at aerodromes have occurred, will the hon. gentleman recommend to the Air Minister that Committee be appointed to enquire into the arrangements for aerodromes on which money has been spent?

Major Baird: I will report the hon. member's suggestion to the Air Ministry, but I think the matter is sufficiently in hand to obviate that necessity.

Bombing of Enemy Towns (Cologne).

SIR RICHARD COOPER on June 27th asked the Secretary of State for Foreign Affairs whether the decision of the British Government to refrain from bombarding Cologne on Corpus Christi Day was communicated by the German Government to the German people through the Press or in any other way; and whether he can say that the concession was taken advantage of by the German military authorities for the movement of troops or supplies within the privileged area?

Lord R. Cecil: I cannot say what action the German Government may have taken with regard to the publication of His Majesty's Government's decision in this matter. The second part of the question should be addressed to the War Office.

Mr. Pemberton Billing: Is the noble Lord aware that in consequence of this a number of German squadrons were released to take part in an offensive against the British, and in these circumstances will he recommend to the Government that it shall not occur again?

Mr. Speaker: That is a matter for the War Office.

Mr. Outhwaite: Referring to the first part of the reply, has the noble Lord's attention been drawn to the statements in the German papers that Corpus Christi Day is held on a different day in Germany to that in France, and that no bombardment of Paris took place on the Sunday when the celebration was held in France; and, therefore, does it not follow that the whole question has been under discussion in Germany?

Cotton Imports.

COLONEL YATE asked the Under-Secretary of State for Foreign Affairs whether, before the removal of the embargo on the import of cotton into Switzerland, the Admiralty, the War Office, and the Air Board were consulted in the matter; and, if so, will he state whether they did or did not favour the removal of the embargo?

Lord R. Cecil: Representatives of the Admiralty and War Office took part in the negotiations leading to the removal of the embargo. Beyond this the offices named were not formally consulted. I have received no intimation from them on the subject.

Colonel Yate: Will the right hon. gentleman answer the last part of my question: Did they or did they not favour the removal of the embargo?

Lord R. Cecil: I cannot answer it beyond what I have said. There were representatives of these two offices concerned in the negotiations, and I have received no information from them on the subject.

Accidents.

MR. OUTHWAITE asked the Under-Secretary of State for the Air Ministry how many officers and men of the Royal Flying Corps and the Royal Air Force have been killed by accident in this country during the past six months; and whether at the coroners' inquests that have been held in connection with these accidents expert evidence has been given as to their cause?

Major Baird: It is not in the public interest to give the figures asked for in the first part of the question. As regards the second part of the question, a Court of Enquiry by senior officers as to the cause of any accident is immediately

held, and these officers give evidence at the coroner's inquest. In any case where it appears possible that the construction of the aeroplane was at fault a further enquiry is made by a special accidents committee responsible directly to the Air Ministry.

Mr. Outhwaite: Why is it that the figures asked for in this question have been given on previous occasions and now cannot be given? Is it because there has been a great increase in the number of accidents?

Major Baird: I am not aware on what occasion those figures were given. I am quite prepared to tell the hon. gentleman in private why they cannot be given. Indeed, there was an answer to a question not put explaining that these figures would be misleading unless they were accompanied by the statement of the number of pilots under instruction and training, and it is impossible in the public interest to give that information, for the simple fact that the Germans do not give us that information.

Mr. Outhwaite: Will the hon. and gallant gentleman, at any rate, bear in mind the concern that is felt about the large number of accidents that are taking place?

Major Baird: I am informed that is so, but if the hon. member attended the meeting addressed by the Secretary of State upstairs he will recollect that my right hon. friend went very fully into this question, and, in view of the additional circumstances to which I have referred, there is no justification for alarm on the ground that there is an undue number of accidents.

Colonel C. Lowther: Is it not a fact that the great proportion of accidents have happened in machines known as the R.E.8?

Major Baird: Oh, no; certainly not.

Mr. Outhwaite: Can the hon. and gallant gentleman give any assurance—

Mr. Speaker: We had better pass on. There are over too question to-day.

R.A.F. Machines.

MR. JOYNSON-HICKS asked the Under-Secretary of State for the Air Ministry whether orders have recently been given for a particular make of machine denounced as dangerous many months ago, which is in any case obsolescent, and which could be replaced by another well-known machine with advantages to the force and to the satisfaction of the pilot; and, if so, why this has been done?

Major Baird: The value and reliability of the type of machine to which my hon. friend presumably refers have been demonstrated in the field, and it is necessary to maintain its supply until newer types can be produced in sufficient quantities.

R.A.F. Casualties.

MR. JOYNSON-HICKS asked the Under-Secretary of State for the Air Ministry what proportion the fatal casualties in flying in this country bore to those at the front for the year 1917 and for the first five months of this year?

Major Baird: The proportionate figures asked for in this question would be entirely misleading in the absence of a comparative statement as to the number of pilots under instruction, standards of training, and number of hours flown. Considerations of public interest do not allow this information to be made public.

R.A.F. Engines.

MR. JOYNSON-HICKS asked the Under-Secretary of State for the Air Ministry how many aeroplanes are now in stock waiting for engines; and when there is any hope of engines being provided in a sufficient quantity to utilise these machines?

Major Baird: A considerable quantity of aeroplanes are at present in store, but it is not in the public interest to state the actual number. It is anticipated that all machines at present surplus to requirements will be fitted with engines before long.

Mr. JOYNSON-HICKS asked the Under-Secretary of State for the Air Ministry what percentage of the output of British engines promised to the House of Commons by the Prime Minister in the Secret Session of July, 1917, on the authority of Sir William Weir has been fulfilled?

Mr. Kellaway: I have been asked to reply to this question. No record is available of statements made at the Secret Session, but all estimates made by the Aircraft Production Department of the Ministry have been substantially justified by the results. The deliveries of aeroplanes for the three months, of March, April and May, 1918, were 116 per cent. in excess of the deliveries during June, July and August, 1917, whilst the excess in the deliveries of engines was 105 per cent. The increase in the fighting value of the aeroplanes is very much higher than these figures would indicate, as the engines delivered during the three months just completed are of a much higher and more powerful type than those delivered during the three months of last year.

The British Air Service

"PER ARDUA AD ASTRA"

The Royal Air Force.

London Gazette, June 25th.

The following temp. appointments are made at the Air Ministry:—
Staff Officers, 1st Class.—And to retain their temp. rank whilst so employed:—
Maj. (Temp. Lieut.-Col.) H. C. T. Langdon, Capt. (Temp. Lieut.-Col.) R. P. Williams; May 15th.

Staff Officers, 2nd Class.—And to be Temp. Maj. whilst so employed if not already holding that rank:—Capt. (Temp. Maj.) J. McIntyre; May 15th. Capt. C. H. S. Taylor; June 5th.

Staff Officers, 3rd Class.—And to be Temp. Capt. whilst so employed if not already holding that rank:—G. D. Pryor (Maj., Camb. R.), and is granted a temp. commn. as Maj.; April 20th. Capt. S. J. A. Beale, Lieut. (Temp. Capt.) G. G. Fairbairn; May 15th. (Q.) Lieut. E. N. Layton; May 20th. (Air) J. P. Flynn (Temp. Lieut., Ches. R.) is granted a temp. commn. as Lieut.; May 22nd.

Staff Officer, 4th Class.—Lieut. G. Purvis-Russell-Balfour-Kinnear; April 30th. (Substituted for notification in the Gazette, May 21st.)

The following temp. appointments are made:—
Director.—Lieut.-Col. E. M. Maitland, D.S.O., and to be Temp. Brig.-Gen. whilst so employed; April 1st.

Staff Officer, 2nd Class.—Lieut. (Temp. Capt.) S. G. Rome, M.C., and to be Temp. Maj. whilst so employed; May 21st.

Staff Officer, 3rd Class.—Lieut. (Temp. Capt.) L. Henshall, and to retain his temp. rank whilst so employed; June 10th.

Flying Branch.

Maj. P. Babington, M.C. to be Temp. Lieut.-Col. whilst employed as Lieut.-Col. (A. and S.); June 14th.

Capt. (Temp. Maj.) E. W. Powell to be Temp. Lieut.-Col. whilst employed as Lieut.-Col. (A. and S.); June 17th.

Lieuts. to be Temp. Capt. whilst employed as Capt. (A. and S.):—A. H. Curtis; June 5th. W. B. Green, F. W. Lowen; June 9th. (Hon. Capt.) T. A. Gladstone; June 10th. H. A. Patey; June 11th. M. V. McKeon; June 16th.

Lieut. J. S. Gifford to be Temp. Capt. whilst employed as Capt. (K.B.); June 16th.

Lieut. H. E. Freeman-Smith to be Lieut. (K.B.), from Observer; April 15th. Lieuts., Observer Officers, to be Lieuts. (A. and S.):—W. S. V. Oliver, D. J. Stewart; April 20th. S. E. Storrar; April 21st. R. W. Rose; April 22nd. W. Guy, E. C. Booker; April 23rd. R. O. C. MacDonald, M.C.; April 25th. J. S. Cassells, M.C.; April 26th. E. Wilson, M.C.; April 27th. L. M. Quelch; April 28th. W. P. Bunt; April 29th.

Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (A. and S.):—F. D. Chappell; April 16th. E. B. Jones, A. H. Ashton, R. Fawcett, G. Crocker; April 18th. H. J. Marshall, R. C. Iles, C. Dixon; April 19th. R. R. E. Dimmick, R. McL. Dunn; April 20th. H. Hudson, F. J. Griffiths, A. J. S. Winton, L. Barron, S. A. Gulliver; April 22nd. C. Wilson, M. Dawson, A. Manders; April 23rd. W. H. Gann, E. J. Taylor; April 24th. J. Harris, C. Roper, A. E. Gammon, W. Hornby; April 25th. R. M. Guiney; April 26th. F. W. Morgan; April 27th. G. A. Madin, D. D. M. Eastwood, G. A. Richardson, S. Scott; April 28th. A. E. V. Sadd, D. C. Evemy; April 29th. G. H. Collins, P. H. B. Wood, L. G. Farrant, C. T. Theobald, C. G. Burnip; April 30th.

Sec. Lieut. I. Carr (late S.R., R.F.C., on prob.) is confirmed in his rank as Temp. Sec. Lieut. (A. and S.); April 23rd.

The following are granted temp. commissions as Sec. Lieuts. (A. and S.):—W. S. B. Walker (Temp. Lieut. R.W. Fus.), and to be Hon. Lieut.; April 18th. R. E. C. Spencer (Lieut., Wilts R., S.R.), and to be Hon. Lieut.; J. H. Paterson (Lieut. I.A.R.O.), and to be Hon. Lieut.; L. R. Wheeler (Temp. Lieut., Br. W.I.R.), and to be Hon. Lieut.; April 20th.; S. E. V. Quin (Lieut., Welsh R.), and to be Hon. Lieut.; E. M. Prichard (Temp. Sec. Lieut., attd. R. W. Fus.); April 22nd. S. B. Moir (Temp. Lieut., R.F.), and to be Hon. Lieut.; T. C. Stuart (Temp. Lieut., New Armies Gen. List), and to be Hon. Lieut.; H. St. C. Duncan (Temp. Sec. Lieut., Br. W.I.R.); April 23rd. R. L. Paine (Temp. Sec. Lieut., York R.); E. F. Rogers (Temp. Lieut., M.G.C.), and to be Hon. Lieut.; April 24th. J. C. Houston, M.C. (Lieut., Lovat's Scouts Yeo., T.F.), and to be Hon. Lieut.; April 25th. B. W. P. Kirby (Sec. Lieut., Dorset R., S.R.); April 27th. F. Egerton (Temp. Lieut., A. Cyclist Corps), and to be Hon. Lieut.; F. G. W. King (Temp. Lieut., R. Ir. Fus.), and to be Hon. Lieut.; April 28th. T. Sandilands (Temp. Lieut., Sco. Rif.), and to be Hon. Lieut.; April 29th. J. Schofield, M.C. (Capt., Essex R., T.F.), and to be Hon. Capt.; H. B. Hampson (Lieut., Manch. R., S.R.), and to be Hon. Lieut.; H. D. D. C. Tiley (Lieut., E. Surr. R., S.E.), and to be Hon. Lieut.; April 30th. F. H. Williams (late Lieut., Cape Cyclists), and to be Hon. Lieut.; A. H. Malan (late Lieut., S.A. Inf.), and to be Hon. Lieut.; May 2nd. S. S. Saunders; June 7th.

The following Cadets are granted temporary commns. as Sec. Lieuts. (A. and S.):—G. H. Keat; May 19th. L. S. Macdonald, W. G. Landon; May 21st. The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (A. and S.):—W. E. Lewis, A. J. Mantle, H. M. Schofield, F. C. Wareham, J. P. Corkery; June 7th.

L. Timmons, Prob. Observer Officer (late R.N.A.S.), is granted a temp. commn. as Sec. Lieut., Observer Officer; April 25th.

The following Cadets are granted temp. commns. as Sec. Lieuts., Observer Officers:—B. L. M. Bunting, G. R. Porteous, A. Golding, J. P. Mills, T. J. Leighs, G. Paul, E. T. Jupp, W. C. Dargavel, R. D. Hughes, T. W. Hopley, C. A. Moth; June 22nd. A. E. Doncaster, H. Ellis, N. W. Jackson, J. K. Mitchell, P. E. Olley, H. Pitkin, D. C. Roy, L. F. C. Sayers, J. L. Stephenson, W. H. Thornton; June 24th.

Sec. Lieut. J. McDonald (late Gen. List, R.F.C., on prob., date of first commn. March 14th) is confirmed in his rank as Sec. Lieut., Observer Officer; June 7th. H. W. Goss is granted a temp. commn. as Sec. Lieut. (K.B.); May 31st.

The following Prob. Flight Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (Dir.):—W. A. Rahn, E. V. Hunter, J. T. Phillips, R. C. Unmack, R. H. Baker, R. C. Hawken, N. M. Smith; June 5th.

Capt. R. E. Cuff (Capt., N. Lan. R., S.R.) relinquishes his commn. on account of ill-health; June 26th.

Lieuts. relinquish their commns. on account of ill-health caused by wounds, and are granted the hon. rank of Lieut.:—G. Kay, E. T. Vautier; June 26th. Lieut. C. R. F. Wickenden relinquishes his commn. on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; June 26th.

Lieut. A. Ashton (Lieut., R.G.A., S.R.) relinquishes his commn. on account of ill-health contracted on active service; June 26th.

Sec. Lieut. F. E. B. Lord Napier and Ettrick relinquishes his commn. on account of ill-health contracted on active service; June 26th.

The notification in the Gazette June 7th concerning A. R. Coppin is cancelled. The initials of E. B. G. Morton are as now described, and not as in Gazette of June 18th.

Administrative Branch.

Capt. F. C. Dixon to be Temp. Maj. whilst employed as Maj.; June 15th. To be Temp. Capt. whilst employed as Capt. (Sec. Lieut. (Temp. Lieut.) H. B. Everest; April 1st. Sec. Lieut. J. I. Thompson, but with pay and allowances of Lieut.; April 22nd. Lieut. J. N. Stephens; May 31st. Lieut. F. Hitchins; June 1st. Lieut. (Hon. Capt.) E. W. French (from A. and S.); June 17th. Lieut. Lord H. Cecil; June 18th.

Sec. Lieuts. to be Temp. Lieuts. whilst employed as Lieuts.:—H. L. Dawson; May 31st. J. E. Dawes; June 2nd. (Hon. Lieut.) G. F. Randall; June 3rd. (Hon. Lieut.) F. H. Jones; June 9th.

Lieut. T. B. W. Spencer to be Lieut. (from A. and S.); June 10th. P. Lormani (Hon. Lieut. in Army) is granted a temp. commn. as Lieut.; June 17th.

The following are granted temp. commns. as Sec. Lieuts.:—L. R. Ellwood (Hon. Lieut. in Army), and to be Hon. Lieut.; May 20th. J. E. Betts, T. Caine, A. E. Leggett, B. S. Tydd, M. J. Watt; June 13th. C. L. Champion, O. T. Burne (late Lieut., R.N.V.R.), and to be Hon. Capt.; June 17th. G. T. Cain (late F. Sub-Lieut., R.N.A.S.), and to be Hon. Lieut.; V. J. Atterton, D. J. Beaumont, I. G. Bethwaite, E. J. H. Bluet, E. J. Brooks, D. Cameron, A. J. Christie, C. M. S. Churchill, S. J. Collett, J. Colquhoun, J. H. Davie, S. S. Dillingham, H. Ellingham, H. J. Gerred, F. F. P. Hammond, L. H. S. Hardy, W. H. Hitch, G. Hobson, A. L. Hookham, C. H. Ivatts, A. H. M. Jacoby, R. E. Jeffrey, J. Johnston, W. A. A. Joyner, T. G. Knowles, M. Laidlaw, C. C. Lindsay, A. G. S. Lyford, A. R. Matthews, D. McCulloch, C. McPherson, S. C. Millett, B. Moore, W. H. Osborne, G. Overton, H. C. Pearson, W. Pouting, A. Potter, R. L. Powell, C. Rolfe, W. P. G. S. McHutchen, H. S. Shaw, R. W. Simpson, F. C. Starkey, H. W. Weedon, H. R. White, H. Willis, H. Worley, R. Wylie, S. L. Boothroyd, G. R. Neal, J. H. Pattman, J. Rowley; June 20th. J. M. Blake, H. E. Rea; June 21st. L. T. M. Griffin (late Lieut., R.F.A.), and to be Hon. Lieut., C. N. Leeston-Smith (late F. Sub-Lieut., R.N.A.S.), and to be Hon. Lieut., T. Bell, G. W. Biddle, W. N. Doble, W. G. Fairley, J. S. Hodgson, F. V. Mataraly, T. J. Q. O'Hara, E. Redpath; June 24th. R. Laurier; June 26th. W. Littlejohn; June 27th.

Lieut. H. C. Wright relinquishes his commn., and is granted hon. rank of Lieut.; June 26th.

Sec. Lieut. J. W. Webberley relinquishes his commn. on account of ill-health contracted on active service, and is granted hon. rank of Sec. Lieut.; June 26th.

Technical Branch.

Maj. R. G. L. Markham to be Temp. Lieut.-Col. whilst employed as Lieut.-Col.; April 1st.

Lieuts. (Temp. Capt.) to be Temp. Maj. whilst employed as Maj.:—E. W. Havers; May 22nd. J. J. Botterill; June 1st.

The following are granted temp. commns. as Capt.:—A. F. Allan, E. E. Benest; April 1st.

Sec. Lieuts. to be Temp. Lieuts. whilst employed as Lieuts.:—(Hon. Capt.) H. E. Paquin; May 13th. W. G. Horton; May 23rd. E. C. Robinson; May 27th. R. G. Shackel; June 9th.

The following are granted temp. commns. as Sec. Lieuts.:—F. J. Welch (late Lieut., R.N.V.R.), and to be Hon. Capt.; P. S. Reed (late Lieut., R.N.V.R.), and to be Hon. Capt.; April 1st. A. G. F. Nash; June 20th.

Sec. Lieut. J. G. F. Horridge relinquishes his commn., and is granted the hon. rank of Sec. Lieut.; June 26th.

Medical Branch.

H. F. Horne (Bt. Maj., R.A.M.C., T.F.) is granted a temp. commn. as Maj., and to be Temp. Lieut.-Col. whilst employed as Advisory Sanitary Officer; May 28th.

Capt. T. Gibbons, from Observer Officer, is granted a temp. commn. as Capt.; April 27th.

The following are granted temp. commns. as Capt.:—G. D. Kerr; May 1st. C. H. S. Taylor (Temp. Surgeon, R.N.); June 5th. C. S. Glegg; June 7th. F. L. Dickson, A. Moir-Gray, H. Munro, C. R. M. Pattison; June 10th. W. T. Williamson; June 25th. S. J. Moore; June 26th.

The following are granted temp. commns. as Lieuts.:—H. C. Cox; June 1st. R. Malcolm; June 4th. C. A. E. Cook, J. B. Dunlop, P. Hardy, G. A. Simmons, A. J. Swanton, B. R. B. Truman, P. E. Williams, J. W. Yorke-Davies; June 10th. H. F. Squire, C. H. Vernon; June 18th. W. A. Cooper; June 20th. W. Cahill; June 24th. E. S. Sharpe; June 26th.

Memoranda.

The following are granted temp. rank of Capt. while spec. employed:—Lieut. M. R. Grover, Sec. Lieut. R. Bonser; May 29th.

Sec. Lieut. H. J. Burns is granted temp. rank of Lieut. while spec. employed; May 29th.

Lieuts. relinquish their commns. on ceasing to be employed:—R. Parkhouse; June 17th. P. Brookes; June 18th.

London Gazette, June 28th.

The following temporary appointments are made:—

Staff Officers, 2nd Class.—And to be Temp. Maj. while so employed:—(P.)—Capt. W. D. Budgen, Lieut. (Temp. Capt.) H. J. G. Newman; June 29th.

Staff Officers, 3rd Class (P.)—Capt. M. W. Bovill; May 26th. Capt. C. J. Foot; June 10th. (Q.)—Sec. Lieut. (Temp. Lieut.) J. S. Goggin, and to be Temp. Capt. while so employed; May 17th. Lieut. (Temp. Capt.) T. L. Edwards, and to retain his temp. rank while so employed; June 3rd.

Flying Branch.

Lieuts. to be Temp. Capt. while employed as Capt. (A. and S.):—L. P. Coombes, A. O. Lewis-Roberts; June 12th. W. F. J. Harvey; June 17th.

To be Lieutenants (A. and S.):—Sec. Lieut. (Hon. Lieut.) T. W. L. Dickson (from Tech.); June 25th. Lieut. R. P. Romer (from K.B.); June 28th.

Lieutenants, from Observer Officers, to be Lieutenants (A. and S.):—K. E. Tanner; April 24th. L. F. Ebbutt; May 15th. C. Donald; May 16th. C. N. Silvester; May 19th. W. Henderson; May 21st. W. E. B. Barclay, M.C., and to be Hon. Capt.; May 22nd. C. D. McGurk, S. D. Chard; May 23rd. H. W. Steele; May 25th. M. H. Drake, G. W. Doolittle; May 26th.

Second Lieutenants (late General List, R.F.C., on probation) are confirmed in their rank as Second Lieutenants (A. and S.):—J. C. Barker; April 5th. R. A. Arnott, W. F. Thorne; April 12th. E. W. Thomson; April 14th. W. M. Standring, R. E. La Douceur; April 15th. P. C. Heathers; April 17th. L. R. Armstrong, A. C. Forrest; April 18th. M. S. Misener; April 19th. G. T. Young; April 20th. R. G. Sparey; May 6th. H. W. G. Triggs, C. R. Knott, S. Whitehouse, H. Natrass; May 11th. H. W. Sheard, T. E. McMann, G. M. P. O'Keefe, D. S. Carrie; May 14th. G. C. Rogerson; May 15th. W. H. Thomas, A. Preston; J. D. McKeogh; May 16th. R. R. H. Taylor, L. B. Jupp, H. B. Roy, L. A. Whiting, A. S. Compton, A. T. W. Boswell, J. S. Pickles, J. W. Sole, F. Hamilton; May 17th. H. Phillips, H. M. Bickle, P. A. Haynes, F. T. Cockburn; May 18th. D. S. Reid, W. A. Erskine, F. C. Wells, S. W. Hollingworth, G. A. H. Nudds; May 19th. A. Wilkinson, J. T. Sorley, T. Lees, J. C. Stone, H. E. Varley, B. C. Fox, C. E. Turner, D. C. Collier, T. H. Laing, H. Wearne,

W. Lofts, G. C. Page, H. D. Haynes; May 20th. E. Slinger, G. K. Green, A. McFarlan, E. K. Wallis, J. R. Hill, J. P. McClelland, I. L. Dutton, C. S. Hill, F. T. Stott, J. E. Machin, C. O. Carson, S. C. Lambert, J. N. Ogilvie; May 21st. C. R. Campbell (date of first commn., Feb. 10th), H. Douthwaite, A. C. Macaulay, F. W. B. Anderson, H. A. Scrivener, C. Workman, R. M. Helm, A. W. Kilpatrick, R. H. Mullens, R. H. Rickards, L. S. Ford, R. Pattison, J. H. W. Haswell, F. A. Browning, R. G. Mullette, J. G. Winks; May 22nd. L. A. Arnold, B. Dixon, H. Walker, J. G. Coats; May 23rd. H. H. Blanchard, C. H. Seffery, G. B. Dunlop, P. E. J. Thomas; May 24th. N. Cooper, L. G. Cartwright, L. S. McCullagh, H. Seddon, J. R. Dean, C. A. Harvey, J. E. Crouch, G. D. Coates, T. G. C. de Vall, W. D. Williams, R. B. Wightman, L. Stuart Ash, W. A. Brett, W. F. C. Cooper, S. J. Mason, A. Paget, B. Dawe, E. Hemsley, D. T. Turnbull, J. F. McNamara, R. W. T. Harrow, S. T. Franks, W. Hall (date of first commn., Feb. 2nd), L. L. Saunders, C. E. Thomas, C. S. Garden, E. J. Madill, G. S. Taylor, E. J. Stevenson, G. P. Giles, W. R. Allison, R. G. Carr, T. H. Jacques, D. C. McDonald; May 25th. G. L. Bell, C. R. Roushorne, C. W. Russell, F. B. Love, R. B. Murray, F. E. Ashoe, A. L. Bloom, F. W. P. Reynolds, W. H. Basker, W. Marsden, W. E. G. Heanly, N. O. M. Foggo, J. K. Grant; May 26th. A. R. S. Procter, G. C. Easton, J. E. Gibbons, C. S. Gray, R. Bennett, H. E. Gentles, C. Keene, J. T. Rose, H. F. Shrimpton, C. V. Towns, A. Bennett, G. C. R. Hamilton, G. F. Geiger, G. A. R. Hill, G. Wright, B. H. Fitter, J. A. Robertson, C. F. Abbott, L. H. Ridley, C. F. W. Illingworth, A. C. Irwin, E. L. McCowen, J. Sayner, A. W. Grant, E. H. Cornes, J. H. Walton, F. W. Sver; May 27th. J. G. Andrews, J. G. Hojel, A. C. Scott, G. A. Threadgold, H. M. Jacques, R. H. McSheppard, C. Hinn, A. T. Wiltshire; May 28th. A. A. Bartam, G. A. Parsons, D. H. Tyler, R. L. Lawson, R. McK. Souby, S. H. Batty, P. King, C. A. Pierpoint, A. Hemingway; May 29th. J. W. F. Merer, F. J. Hunt, P. W. Lingwood; May 30th. W. H. Salmon; May 31st.

J. Hewitt (Capt., late Gen. List, R.F.C.) to be Sec. Lieut., A. and S., and to be Hon. Capt.; May 18th.

P. T. Carden, M.C. (Lieut., late Gen. List, R.F.C.) to be Sec. Lieut., A. and S., and to be Hon. Lieut.; May 26th.

F. de M. Hyde (Sec. Lieut., late S.R., R.F.C., on prob.) is confirmed in his rank as Sec. Lieut., A. and S.; May 25th.

G. C. Hyde (Sec. Lieut., late S.R., R.F.C., on prob.) is confirmed in his rank as Sec. Lieut., A. and S.; May 26th.

The following are granted temporary commissions as Second Lieutenants (A. and S.):—J. C. Belford (Lieut., L'pool R., T.F.), and to be Hon. Lieut.; May 9th. R. D. Blackman (Temp. Capt., A.S.C.), and to be Hon. Capt.; May 11th. P. J. Rahill (Lieut., Ches. R.), and to be Hon. Lieut.; May 13th. E. Cropper (Lieut., Alberta R., C.E.F.), and to be Hon. Lieut.; May 16th. J. M. Brown (Sec. Lieut., Sco. Rif., S.R.), D. Millar (Lieut., High. L.I., T.F.), and to be Hon. Lieut.; May 18th. H. S. Hobby, M.C. (Lieut., Yorks. R., S.R.), and to be Hon. Lieut.; May 19th. J. C. Robinson (Temp. Sec. Lieut., Yorks. L.I.), R. J. Weatherill (Lieut., Cent. Ont. R., C.E.F.), and to be Hon. Lieut.; May 20th. G. Jacob (Sec. Lieut., E. York R.), H. M. Smith (Sec. Lieut., Suff. R., T.F.), P. W. Fox (Lieut., Br. Columbia R., C.E.F.), and to be Hon. Lieut.; May 21st. F. H. Choate (Lieut., Alberta R., C.E.F.), and to be Hon. Lieut.; C. S. Whellock (Temp. Sec. Lieut., attd. R. Fuss. R.), F. G. Prince (Sec. Lieut., Lond. R., T.F.); May 22nd. G. H. E. Roxburgh (Sec. Lieut., High. L.I., T.F.), L. G. Bullock (Temp. Sec. Lieut., attd. Notts and Derby R.); May 23rd. M. C. Fraser (Temp. Sec. Lieut., attd. Arg. and Sudh'd. Highrs.); May 24th. W. G. Davis (Temp. Sec. Lieut., attd. R. Fuss.), W. Dougall, M.C. (Lieut., Sask. R., C.E.F.), and to be Hon. Lieut.; B. A. Wilson (Lieut., C.F.A., C.E.F.), and to be Hon. Lieut.; J. T. Smeeton (Lieut., Br. Columbia R., C.E.F.), and to be Hon. Lieut.; May 25th. A. W. Davidson (Temp. Sec. Lieut., Wilts. R.), A. T. Reed (Sec. Lieut., Lond. R., T.F.), J. M. Robertson (Sec. Lieut., High. L.I., T.F.); May 26th. L. T. Smith (Sec. Lieut., Yorks. L.I.), S. L. Mucklow (Sec. Lieut., Lancs. Fus., T.F.), R. R. C. Winter (Temp. Sec. Lieut., Durh. L.I.), T. St. P. Bunbury (Capt., R.F.A.), and to be Hon. Capt.; S. E. Arridge (Sec. Lieut., Yorks. L.I., S.R.), M. C. Cook (Temp. Sec. Lieut., Notts and Derby R.), P. Dendy (Sec. Lieut., Norf. R., T.F.), A. W. Allan (Lieut., Camb. R., T.F.), and to be Hon. Lieut.; R. E. Davidson (Lieut., Can. F.A., C.E.F.), and to be Hon. Lieut.; May 27th. J. S. H. Willis (Temp. Sec. Lieut., E. Kent R.); May 28th. M. E. Challis (Sec. Lieut., W. Kent R., T.F.), J. Stell (Sec. Lieut., R. Scots, S.R.); May 29th. H. J. Gemmel (Temp. Sec. Lieut., Rut. Brig.), S. H. Joelson, M.C. (Temp. Lieut., attd. R. Fuss.), and to be Hon. Lieut.; May 30th. Cdt. F. O. McDonald is granted temp. com. as Sec. Lt., A. and S.; May 17th.

Prob. Flight Officers (late R.N.A.S.) are granted temp. commissions as Second Lieutenants, A. and S.:—J. B. Badgley, H. J. McLeod, C. B. Rutherford; May 24th. W. D. E. Donaldson; May 25th. H. G. Clappison, R. W. Frost; May 26th. S. B. Potter, H. C. Price, A. G. Fraser. June 12th.

F. Rooney is granted a temp. commn. as Sec. Lieut. (K.B.); June 2nd.

Cadets are granted temp. commissions as Second Lieutenants, Observer Officers: H. Wepener, C. I. Bray, C. J. Byrne, S. Burn, S. C. Barrow, I. W. Brodie, S. G. Birch, E. J. Corbett, C. M. Coleman, R. Cockburn, F. G. Craig, D. O. Davies, H. Draper, J. H. Dunbar, S. R. Durdin, J. Gondré, W. E. Harper, A. B. Henderson, N. Johnson, J. W. London, J. N. Mitchell, H. S. Mantle, F. F. McKilligan, F. G. Mills, L. Millar, J. Pullar, D. B. Robertson, G. W. Shickle, A. A. Simpson; June 15th. S. G. Bates; June 24th.

Lieut. J. E. Rettie resigns his commn. and is granted the hon. rank of Lieut.; June 29th. Lieut. R. J. Gosse relinquishes his commn. and is granted the hon. rank of Lieut.; June 29th.

Administrative Branch.

J. H. M. Arden, D.S.O. (Bt. Lieut.-Col., Res. of Off., Temp. Lieut.-Col. in Army) is granted a temp. commn. as Lieut.-Col.; June 17th.

C. V. Beresford (Maj., Worc. R.) is granted a temp. commn. as Maj.; June 5th.

Sec. Lieut. (Temp. Maj.) J. E. L. Wrench, C.M.G., to be Lieut.; April 2nd.

W. M. Long (Temp. Lieut., R.F.A.) is granted a temp. commn. as Lieut., and to be Temp. Capt. whilst employed as Capt.; April 1st.

W. H. Bragg (Lieut., R.F.A., T.F.) is granted a temp. commn. as Lieut.; June 6th.

Second Lieutenants to be Temporary Lieutenants whilst employed as Lieutenants: (Hon. Lieut.) J. A. Gibson; May 13th. (Hon. Lieut.) R. F. Messervy; June 5th. A. L. Cockburn, (Hon. Lieut.) T. A. Gardiner; June 13th.

To be Lieutenants:—Lieut. B. R. Apps (from A. and S.); April 30th. Lieut. V. G. Southern, M.C. (from A. and S.); Lieut. L. Walmsley, M.C. (from O.); June 14th.

Sec. Lieut. F. H. Barratt relinquishes his commn., and is granted the hon. rank of Sec. Lieut.; June 29th.

Sec. Lieut. E. M. de Fleury resigns his commn.; June 29th.

Technical Branch.

Lieut. (Temp. Capt.) J. Inwood to be Temp. Maj. while employed as Maj.; April 1st (substituted for notification in *Gazette* April 19th).

Lieutenants, A. and S., to be Lieutenants:—F. W. Clarke; June 1st. A. H. Rayner; June 13th.

Lieutenants, A. and S., to be Second Lieutenants (Hon. Lieutenants):—J. A. Rossi; May 25th. F. E. Richardson, J. Robertson, G. H. Wilkinson; June 8th.

Lieutenants, Observer Officers, to be Second Lieutenants (Hon. Lieutenants):—E. L. Pollard, M.C., J. C. Boughton; May 25th. C. E. Day, H. R. Ward, F. A. Herron, H. I. Fordred; June 8th.

Second Lieutenants (late General List, R.F.C., on prob.) are confirmed in their rank as Second Lieutenants:—J. V. Cook; June 7th. H. H. Ballard, R. O. Montgomerie; June 8th.

The following are granted temporary commissions as Second Lieutenants:—J.

Imber; April 1st. E. G. A. Jones (Lieut., York and Lanc. R., T.F.), and to be Hon. Lieut.; May 25th. W. G. N. Cutt (Temp. Lieut., M.G.C.), and to be Hon. Lieut.; A. T. Brogden (Lieut., Durh. L.I., T.F.), and to be Hon. Lieut.; A. H. Cray (Sec. Lieut., North'd. Fus., T.F.); W. Rose (Temp. Lieut., M.G.C.), and to be Hon. Lieut.; June 8th. S. W. Turner, Sec. Lieut., from Admin., to be Sec. Lieut.; May 31st.

Medical Branch.

Lieut. (Temp. Capt.) C. H. Biddulph-Pinchard to be Temp. Maj. while employed as Admin. Maj.; April 20th. (Substituted for notification in *Gazette*, May 31st).

The following are granted Temporary Commissions as Captains:—A. L. George; June 7th. F. N. B. Smartt; June 21st.

The following are granted Temporary Commissions as Lieutenants:—H. G. James, H. L. Smallbone, S. G. Smith; July 1st.

Lieut. G. O. Roper, from Flying Branch (K.B.), to be Lieut.; June 22nd.

Memoranda.

Second Lieutenants to be Lieutenants:—F. Cain, L. J. Gavin, S. M. Pemberton, April 2nd. A. S. Hamilton, E. J. Mott; May 10th.

Royal Flying Corps (Military Wing).

London Gazette Supplement, June 25th.

Flying Officers.—Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—G. N. Wilton; Sept. 13th, 1917. E. Melver; Feb. 26th. U. Finch; March 7th. W. R. Coventry, H. P. Stewart; March 25th. W. E. Clemens, N. S. Macleod; March 26th. A. D. McBride; March 29th.

Flying Officers (Observers).—Lieut. C. T. Repton, Yeo. (T.F.); March 15th, seniority Sept. 16th, 1916; Lieut. L. McC. Ritchie, N. Brunswick R., Canadian Exped. Force; Feb. 26th, seniority Jan. 4th.

Assistant Instructor in Gunnery (graded as an Equipment Officer, 2nd Class).—Temp. 2nd Lieut. C. E. Hodges, Gen. List, from an Assistant Instr. in Gunnery (graded as an Equipment Officer, 3rd Cl.), and to be Temp. Lieut. whilst so employed; March 10th.

Adjutant.—The appointment of Lieut. D. G. Nairn, A.S.C. (T.F.), notified in *Gazette* of April 23rd, is cancelled.

Park Commanders.—Lieut. D. G. Nairn, A.S.C. (T.F.), and to be Temp. Maj. while so employed; Feb. 7th.

Equipment Officers, 3rd Class.—Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—C. Lyons; Feb. 1st. S. G. Shead; Feb. 7th. C. W. O'Brien; March 28th.

General List.—G. W. Colmer, late Temp. Lieut., to be Hon. Lieut.; Feb. 27th. Temp. Sec. Lieut. J. B. Mawdsley relinquishes his commn. to join Canadian Forestry Corps, and is granted the hon. rank of Sec. Lieut.; March 28th.

To be Temp. Sec. Lieuts.:—Pte. T. E. Gibbs, from Midd'x. R. (T.F.); March 8th. Pte. R. F. Hacon, from M.G. Corps; March 11th. Pte. J. A. Barber from M.G. Corps; March 17th. Sgt. R. J. Mayer, from Yeo. (T.F.); March 19th. Spr. J. K. McGregor, from R.E.; March 22nd.

The following actg. Sgts., from Canadian Ammn. Sub. Park, to be Temp. Sec. Lieuts. (on prob.):—S. C. Paice; Jan. 8th. W. G. Watson, R. S. Warwick; Jan. 18th. W. Endersby to be Temp. Sec. Lieut. (on prob.); March 27th.

London Gazette Supplement, June 26th.

Flight Commander.—The surname of Temp. Lieut. J. S. Dunkerly, Gen. List, is as now described, and not as in *Gazette*; May 27th.

Flying Officers.—Capt. R. G. McMullen, W. Ontario R., Canadian Exped. Force; March 13th. Lieut. J. A. Mausfield, M.C., R. Ir. Fus., and to be secd.; March 16th. Temp. Lieut. T. M. Draper, Gen. List; March 24th. Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—B. Mignault; Dec. 12th, 1917. J. C. L. Mercer, G. F. Manning; Dec. 19th, 1917. J. C. Enlsen; Jan. 5th. A. M. Sandetson; Jan. 7th. W. E. Huxtable; Jan. 11th. G. F. Thompson; Jan. 21st. R. G. Robertson; Jan. 22nd. A. E. Hill; Feb. 17th. L. A. C. Hudson; Feb. 28th. J. A. van Tilburg; March 3rd. K. de Pass; March 4th. A. H. Chisholm, C. Brown; March 8th. E. P. Larrabee; March 10th. J. R. O'Connell; March 11th. G. C. W. Sutcliffe; March 20th. L. K. Debit; March 22nd. E. A. Elliott; March 23rd. H. C. Rath; March 24th. L. Yexer; March 26th. H. Macpherson; March 28th. H. L. Yates; March 29th. C. P. Urich, E. C. Matthews; March 30th. B. Sleightholm; March 31st.

The appointment of Temp. Sec. Lieut. C. F. Brown, attached Durh. L.I., notified in *Gazette* April 11th, is cancelled.

Flying Officer (Observer).—Temp. Sec. Lieut. C. R. Pilcher, R.E.; Jan. 20th, seniority Nov. 29th, 1917 (substituted for notification in *Gazette*, Feb. 14th).

Assistant Instructor in Gunnery (graded as an Equipment Officer, 2nd Class).—Temp. Sec. Lieut. R. C. Sugars, Lab. Corps, to be transd. to R.F.C., Gen. List, and to be Temp. Lieut. whilst so employed; March 31st.

Equipment Officer, 2nd Class.—Temp. Lieut. O. W. Clapp, Gen. List, from 3rd Class; Feb. 2nd.

General List.—The following to be Temp. Sec. Lieuts.:—Actg. Cpl. G. C. W. Duffy, from R.E. (T.F.); March 13th. Motor Cyclist Cpl. J. A. Critchley, from R.E.; March 23rd.

Cadet N. D. Willis to be Temp. Sec. Lieut.; July 5th, 1917 (substituted for *Gazette* notification, July 26th, 1917, describing name as N. P. Willis).

London Gazette Supplement, June 27th.

Flying Officers.—Temp. Sec. Lieut. (on prob.) R. Musgrave, Gen. List, and to be confirmed in his rank; Feb. 14th. Temp. Sec. Lieut. (on prob.) G. E. Satterthwaite, Gen. List, and to be confirmed in his rank; Feb. 18th. The appointment of Sec. Lieut. C. H. Harrison, Yorks. L.I. (T.F.), notified in *Gazette* of July 21st, 1917, is antedated to June 9th, 1917.

Balloon Officer.—Lieut. A. Richards, Midd'x. R. (T.F.), from a Flying Officer; March 15th.

General List.—To be Temp. Sec. Lieuts.:—Pte. R. Fawcett, from A.S.C.; March 1st. Pte. G. Burton, from A.S.C.; March 2nd. Pte. C. N. Davies, from Yeo. (R.F.); March 19th.

London Gazette Supplement, June 28th.

Flying Officer.—Temp. Sec. Lieut. (on prob.) W. B. Fox, Gen. List, and to be confirmed in his rank; Feb. 17th.

Gen. List.—Spr. J. C. Edwards, from R.E., to be Temp. Sec. Lt.; Mar. 12th.

London Gazette Supplement, June 29th.

Flight Commander.—Temp. Sec. Lieut. J. H. Mitchell, Gen. List, from a Flying Officer, and to be Temp. Capt. while so employed; March 13th.

Flying Officers.—Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—A. E. Mewett; Feb. 25th. E. C. Shurley; March 2nd. C. Wilderspin; March 3rd. A. T. Akin; March 4th. W. E. Jackson; March 5th. E. W. Helmer; March 9th. F. P. Little, G. W. Hawken; March 10th. D. A. Shanks, B. M. F. Albanese; March 12th. C. F. Kelsch; March 16th. V. B. McIntosh; March 18th. R. Viall; March 19th. E. G. Weller; March 20th. W. R. K. Atkinson; March 21st. T. B. Burns; March 23rd. H. W. How; March 25th. L. Wilson; March 26th. C. A. Sperry, W. J. Sampson; March 30th. J. B. Seaward, C. E. Hill, T. C. McKechnie; March 31st.

Assistant Instructor in Gunnery (graded as an Equipment Officer, 2nd Class).—Lieut. S. M. Campbell, Sco. Rif., T.F., from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Class); Feb. 19th.

Equipment Officers, 2nd Class.—Lieut. A. H. C. Bruce, R.A., from the 3rd Class; Feb. 8th. 3rd Class.—Temp. Lieut. S. R. Chapman, Bedf. R., and to be transd. to R.F.C., Gen. List; March 1st.

General List.—Temp. Sec. Lieut. S. E. Lewis (Capt., S. Afr. Def. Forces) relinquishes his temp. commission on ceasing to be employed; Dec. 11th, 1916. Sub-Lieut. H. A. Pound, from R.N.V.R., to be Temp. Lieut.; Feb. 6th.



JULY 4, 1918.

AIRCRAFT WORK AT THE FRONT. OFFICIAL INFORMATION.

British.

On the morning of the 25th inst. attacks were successfully carried out against the railway sidings and factories at Saarbrücken, the engine sheds and barracks at Offenbourg and the explosives factory works and railway station at Karlsruhe. Many direct hits were observed on the engine sheds at Offenbourg, and also on the barracks. At Karlsruhe two direct hits were observed on the engine sheds and on the Metallurgique works, causing a large explosion. This is confirmed by photographs. The factories and station at Saarbrücken were damaged. In the course of many attacks by hostile aeroplanes on our machines two of the enemy were shot down and two others were driven down. Three of our machines are missing, one of which is known to have been forced to land in the enemy's lines with engine trouble.

Headquarters, Independent Force R.A.F., June 25th.

"On the evening of the 23rd inst. the weather cleared somewhat, and our bombing squadrons carried out a series of attacks on Metz-Sablon station, three during the evening and a fourth after nightfall. Clouds prevented observation of the results obtained, but over six tons of bombs were dropped on this objective.

On the 24th inst., in spite of high winds and clouds, attacks were successfully carried out upon the factories and sidings at Saarbrücken, the factories at Dillingen [12 miles north-west of Saarbrücken], and the railway sidings at Metz-Sablon. Our formations were attacked by enemy aeroplanes, one of which was sent down in flames, whilst another was driven down out of control. All our machines returned safely.

General Headquarters, June 25th.

"In spite of high winds on June 24th our aeroplanes did a great deal of reconnaissance and other work during the earlier part of the day, and a large number of hostile batteries and other targets were successfully engaged by our guns with the assistance of aerial observation. Later in the day heavy rain made flying impossible. Bombing behind the enemy's lines was carried on with vigour whenever the weather permitted, 15 tons of bombs being dropped by our machines. The enemy did not give our airmen many opportunities for combat, but two German machines were destroyed. Three of our aeroplanes are missing. In addition to the enemy machine already announced as destroyed on June 23rd, a second machine is now established to have been brought down on that date."

Air Ministry, June 26th.

"On the night of the 25th-26th inst. successful attacks were made by us on the enemy's aerodrome at Belchen. Observation was difficult, but much damage is believed to have been done, and a fire was started. Bombs were released from low altitudes and machine guns were fired into the hangars, trains were attacked by machine gun fire by low-flying machines, and one was brought to a standstill. A large number of bombs was also dropped on the railway sidings at Metz-Sablon. On the 26th inst. the railway establishments and powder works at Karlsruhe were attacked with good results. The powder works, the main station, and other railway buildings were hit. Our formations were heavily attacked by hostile aeroplanes. Three of our machines have not returned."

General Headquarters, June 26th.

"Weather conditions on June 25th were unfavourable for artillery observation, but some hostile batteries were located and reported by our machines. A number of reconnaissances were carried out, also, and photographs taken. In air fighting, 10 enemy aeroplanes were destroyed and four driven down out of control. Seven of our own machines are missing. The total weight of bombs dropped during the day and the night following amounted to 10 tons."

Air Ministry, June 27th.

"On the night of the 26th-27th inst. our aeroplanes attacked the chemical works at Ludwigshafen, the factories and railway sidings at Saarbrücken, and the aerodrome at Belchen. Several bombs fell on an active furnace at Saarbrücken. At Belchen aerodrome two hangars were set on fire, also one machine which was out on the aerodrome. All our machines returned safely. One of our machines which was yesterday reported missing has since returned. The enemy bombed one of our aerodromes during the night. No damage was done to our aeroplanes."

General Headquarters, June 27th.

"Seven German machines were brought down by our airmen on June 26th, and two others were driven down out of control. Two of our aeroplanes are missing. With the improvement of the weather, more photographic and artillery observation work was accomplished than has been possible for some time. Day bombing machines dropped 14½ tons of explosives on enemy railway station, dumps, transport, and billets, and on Bruges Docks. On the night of June 26th-27th bombing operations continued, and 16 tons of bombs were dropped by our night-flying machines on various targets without loss."

General Headquarters, June 28th.

"On the 27th inst., a full day's work was done by our reconnaissance, artillery, and photographic machines, and by our observation balloons. There was some increase of hostile activity in the air, and more fighting took place. Twenty German aeroplanes were destroyed, and nine others driven down out of control. Fourteen of our machines are missing. Bombing was carried out vigorously behind the German lines, and 21 tons of bombs were dropped by us during the 24 hours on railway junctions and other targets."

Admiralty, June 29th.

"Weather conditions during the period June 24th to 26th inclusive have not been generally favourable for operations. Air Force contingents working with the Navy have, however, carried out continuous offensive operations, some 15 tons of bombs being dropped on enemy targets and fires started. Enemy aircraft have been active, and three enemy machines were driven down. Two of our machines are missing. In Home waters during the same period anti-submarine, escort, and hostile aircraft patrols have been maintained by sea-planes, aeroplanes, and airships. Hostile submarines have been sighted and attacked. Enemy mines have been located and destroyed, and Allied and neutral ships have been escorted."

General Headquarters, June 29th.

"There was much fighting in the air on the British front on the 28th inst. and enemy machines showed considerable activity. During the day we shot down 17 German aeroplanes and drove down six others out of control. Three of our machines are missing. Our airmen and balloons employed in observation work took advantage of the fine weather to co-operate with the artillery in engaging hostile batteries and dumps with good destructive effect. A great number of explosions and fires were caused thereby. Photographic machines were also active, and many reconnaissances were carried out both by day and night. Twenty-two tons of bombs were dropped by us during the day on various targets, and 14½ tons in the course of the following night."

Air Ministry, June 29th, 3.10 a.m.

"On the afternoon of the 28th inst. our aeroplanes attacked the railway workshops, stations, and sidings at Thionville. Observation was difficult, but direct hits were observed on the works and railway line. Nearly 3 tons of bombs were dropped on this objective. Our formations were attacked by hostile aeroplanes. Severe fighting ensued, during which three hostile aeroplanes were shot down and one other was driven down. Two of our machines have not yet returned, one of which is known to have been forced to land through engine

trouble. On the night of the 27th-28th our aeroplanes made a successful attack on the enemy's aerodrome at Bolchen. Bombs were released from a low altitude, and machine-guns were fired into the hangars. All our machines returned safely. The enemy bombed one of our aerodromes last night. No material damage was done."

Air Ministry, June 29th, 10.30 p.m.

"On the evening of the 28th inst. the enemy aerodrome at Frescaty was attacked. Owing to bad visibility the bursts were unobserved."

"On the 29th inst. the Badische Anilin und Soda Fabrik at Mannheim, in spite of adverse weather conditions, was very successfully attacked. Many heavy bombs were dropped, and six bursts were observed on the factory. Our formation was attacked over the objective by five hostile machines. Three of these were driven down, two of which were out of control. All our machines returned safely."

Air Ministry, June 30th.

"On the night of June 29th-30th bombing squadrons attacked the railway works at Thionville, the sidings at Metz-Sablon, the enemy's aerodromes at Frescaty and Boulay, and other military objectives. Mists prevented the observation of results."

"On the 30th inst. we dropped many bombs at Hagenau aerodrome with good results. The barracks and station at Landau were also bombed. The formation over Landau was heavily attacked by hostile aeroplanes. Three of the enemy were destroyed. Two of our machines are missing."

French.

Paris, June 25th.

"During yesterday six enemy aeroplanes were brought down or fell in a damaged condition. Over four tons of bombs were dropped on aviation grounds in the region of the Aisne."

"Salonica.—In the course of the day's aerial operations two enemy machines were brought down. A third was forced down out of control."

Paris, June 26th.

"During yesterday 22 enemy aeroplanes were brought down or were obliged to land in a damaged condition. Three kite balloons were set on fire."

"Our night and day bombing machines dropped over 17 tons of bombs on aerodromes, bivouacs, cantonments, and ammunition dumps in the battle zone. Explosions and fires were observed."

Paris, June 27th.

"Salonica.—British airmen brought down an enemy machine near Cestovo."

Paris, June 28th.

"On June 26th and 27th, 19 German aeroplanes were brought down or put out of action, and four captive balloons were set on fire by our chasing machines. In addition, a 20th enemy aeroplane was brought down by the anti-aircraft defences. Our bombing machines in the same period dropped during the day and night 58 tons of bombs on aerodromes on the Somme and in the region of the Aisne, on cantonments and bivouacs at Rozieres en Santerre, Fismes, and Guignicourt, and the railway stations of Soissons and Fere en Tardenois. Two ammunition dumps blew up and several fires were observed. Sub-Lieut. Sardinier brought down on June 4th two captive balloons, the 10th and 11th aircraft brought down up to the present by this pilot."

U.S.A.

Paris, June 28th.

"It is established that our airmen have shot down three hostile machines in the Toul region since the beginning of the week-end."

Italian.

Rome, June 25th.

"During the day yesterday and last night the aeroplanes carried out effective bombardments. On the 23rd and 24th inst. nine enemy machines were brought down."

"Our seaplanes yesterday bombed Durazzo. A direct hit was secured on a large steamer, and fires were seen to break out near the enemy's sheds. In spite of lively anti-aircraft fire, all our machines returned safely to their base."

"This morning (June 24th) the aerial bombardment of Durazzo was repeated with greatly successful results. At the same time British machines on a reconnoitring flight over Cattaro engaged enemy machines which had gone up in pursuit, and hit one, which was seen to crash out of control. All the British and Italian machines returned safely."

Rome, June 26th.

"Our flights dropped several tons of bombs on enemy ammunition dumps in the Venetian Plain and on the railway establishments of Mattarello. Seven hostile aeroplanes were brought down. Lieut. Flavio Baracchini reached his 31st victory."

Rome, June 28th.

"The roadstead and military works at Durazzo were bombarded during the day yesterday, with visible results, by a squadron of British aeroplanes and a squadron of seaplanes belonging to the (Italian) Royal Navy."

"The enemy machines which rose to fight were compelled to withdraw, and did not succeed in preventing the action of the above-mentioned squadrons, all of whose machines returned undamaged to their bases."

Rome, June 29th.

"Railway centres and enemy troops in movement were bombarded in the lines of communication by our own and Allied airmen, who during the day brought down three enemy machines."

Belgian.

Havre, June 25th.

"Sub-Lieut. Coppens brought down his eighth enemy balloon. He also brought down a German chasing aeroplane which attacked him."

German.

Berlin, June 25th.

"Lieut. Billik has attained his 20th aerial victory."

Berlin, June 26th.

"Five aeroplanes were shot down out of an enemy squadron, which on June 24th flew from (? south) of Soissons to the Aisne to drop bombs. Twelve enemy machines and three captive balloons were brought down yesterday. Lieut. Udet attained his 33rd, 34th, and 35th aerial victories; Lieut. Kirschstein his 27th; Lieut. Rumeys his 24th; Lieut. Veltjens his 24th; and Lieut. Billik his 21st."

Berlin, June 27th.

"Yesterday our bombing squadrons attacked Paris and the enemy's railway junctions and aerodromes on the way there."

"Five aeroplanes were shot down out of the enemy bombing echelons which, during the last two days, made raids on Karlsruhe, Offenbourg, and the industrial region of Lorraine."

"Lieut. Rumeys obtained his 25th aerial victory."

Berlin, June 28th.

"The strong flying forces brought into action led to violent aerial combats. Yesterday our airmen shot down 25 aeroplanes and one captive balloon, and our anti-aircraft guns shot down five enemy aeroplanes. Capt. Berthold obtained his 37th aerial victory. Lieut. Loewenhardt his 29th, and Lieut. Rumeys his 26th and 27th."

Berlin, June 29th.

"The enemy suffered a heavy defeat in the air. Nineteen enemy aeroplanes were shot down. Lieut. Udet obtained his 35th aerial victory and Lieut. Loewenhardt his 30th."

TRADE PARLIAMENTS AND THEIR WORK.*

By ERNEST J. P. BENN, Chairman Industrial Reconstruction Council.

XI.—THE POSITION OF LABOUR.

IN concluding these articles a word or two further should be said about the position of Labour. Such opposition as exists to the Whitley Report comes from two parties who are the very last that one would expect to find associated in anything. The Whitley Report recommends that Joint Standing Industrial Councils should be composed of equal numbers of representatives of employers' associations and trade unions, and that those councils should form the basis of a complete system of self-government. The principle of the right of Labour to participate in trade questions which affect the welfare of a whole industry is accepted by moderate opinion on both sides, but the reactionary type of employer who still thinks of the world as it was in 1914 is inclined to criticise. This man still fails to see that Labour has any interests in such subjects as raw materials or markets, and he fondly imagines that he will secure the co-operation of Labour and the abolition of restriction of output while keeping Labour leaders in ignorance as to the state of trade generally. On the other hand we get the most forward type of Socialist, the syndicalist and guildsman, who dreams of a world from which Capital is abolished and declines to have anything to do with Joint Standing Industrial Councils on the ground that they are an attempt to perpetuate and bolster up what he is pleased to call the capitalistic system. Needless to say, neither class must be allowed to prevail. I need not bother here to answer the syndicalist who wants to abolish Capital, but I may perchance catch the eye and ear of some employer who has so far failed to grasp the true inwardness of Labour's present demand for a share in the control of industry. There is no suggestion here that Labour should have any say in the control of the individual actions of an individual employer. The employer who has all the risk must be the final judge as to what he shall buy and what he shall sell and at what prices he will complete either transaction; but in our conception of industry we have got far beyond the point when it is regarded as a matter merely of buying or selling by an individual. We have reached the stage when we can see that the welfare of each industry is a matter of vital importance to the nation, also we now realise that all those engaged in that industry—capitalists, managers, work-people, travellers, shopkeepers, clerks, and others—have a right to know that the industry as a whole is sound and prosperous and is likely to provide them with a means of living in return for the study and attention that they are prepared to give to it. If, for instance, as has happened in many trades, our export business has not received the attention it deserves; if there are markets which have never been exploited and demands that have never been satisfied, then Labour is entitled to look into these questions before it will give an answer to the request that will presently be made to do its best to increase production. If, on the other hand, materials are short, machinery non-existent, and capital unobtainable or credit scarce, and, in consequence, it is necessary to ask Labour to go on to half-time, Labour will not,

in future, accept the mere statement of that position from an autocratic body of employers; it will demand the right to go into the circumstances for itself and satisfy itself that things are really so. But apart altogether from the right of Labour to share in the discussion of what may be called general trade politics, there is every advantage to be gained from such partnership. Every trade in the future will find itself in the position of wanting something from the Government. It may want materials; it may want a tariff, it may want something to be done, and is much more likely to want something *not* to be done. It is perfectly obvious that if these demands upon the Government are made by a joint body, composed of employers and employed, they are bound to receive more attention than would be the case if they came from one section only.

Next, and last, if the new conception of industry is accepted, if we get both masters and men to look upon their calling as a branch of the national service, we find for the first time the opportunity of establishing between both parties that confidence the absence of which has been the cause of most of our industrial trouble in the past. It is only the small man that fears from any of these developments some damage to his own personal position. The larger conception knows that the individual interest is, after all, only part of a wider interest, and that the promotion of the latter is the true way to benefit the former. The idea of the control of industry by Joint Standing Industrial Councils is, after all, nothing but a natural development following upon the rise within the last couple of generations of the trade associations and the trade unions.

In conclusion, let me repeat a few of the sentences which sum up the whole of this great question. The betterment and development of our trade for the benefit of all those engaged in it and for the nation as a whole; development, trade by trade, one trade at a time, the trade being the unit; each trade as a branch of national service; each trade as a vital part of the social organism; the abolition of jealousy and secrecy and all that is born of ignorance and small-mindedness; production as the source of all prosperity; waste of material, or method, or of goods, or of effort as a crime against the community. When these ideas begin to be generally understood and applied we shall all be able to afford to smile at the old days when we squabbled for the wages and profits which were insignificant beside what is thus made possible. There is far more for everybody in each of our trades than has ever yet been got out of them, and if Labour and Capital will join hands in this new voyage of discovery the prospects of the future are indeed bright.

[* Mr. Benn's articles on "Trade Parliaments and Their Work" will shortly be published in volume form by Messrs. Nisbet and Co., Ltd., price 1s. net, and may be ordered of any bookseller or newsagent.]

SIDE-WINDS.

THERE was an interesting meeting at the Humber Works, Coventry, on a recent evening. The occasion was to report the result of the efforts made by the management, staff and employees of Humber Ltd., to raise funds for the Coventry and Warwickshire Hospital. Mr. A. H. Niblett (Works Manager) presided, and was supported by Messrs. H. Marshall (Assistant Secretary), J. W. Maude and F. R. Redhead (Joint Hon. Secretaries for Sports Meeting), W. Hannay (Secretary Recreation Society) and T. Palmer (Chairman of the Humber Hospital Saturday Fund Committee). The balance sheet of the Sports Committee showed the net proceeds of the sports to be £235 15s. 10d. The second venture, which consisted of a comic cricket match, concert, whist drive, &c., realised £120 12s. 7d. net. A subscription list amongst the staff and employees realised £241 7s. 5d., making a total of £597 15s. 10d. The Chairman said the result surpassed his expectations, and he congratulated them most sincerely upon the very excellent results they had attained. In thanking the Sports Committee for their work, Mr. Maude remarked that for nearly 50 years he had been associated with the work of athletic committees up and down the country, but he had never been with one which displayed such hard work and united effort as that at the Humber sports.

THE workers in the Tank Department of the Birmingham Guild indulged in an outing on Saturday last, and although up to the time of going to press the official report has not arrived, we feel sure they had a merry time. The following was the programme of the sports:—

12 noon.—Char-à-banc leaves the Chapel Tavern, and will parade the main streets of the town, preceded by the police band.

1.15.—Dinner at Solihull. *Memo.*—Whatever you bring with you; wines; G.B.

3.15.—Arrive at Berkswell.

3.30.—Sports (perhaps). There will be many rare and valuable prizes to be competed for.

1st Race: 100 yards flat race.—Prizes: 1st, 1 box Swan matches; 2nd, 2 lumps of sugar; 3rd, 1 pint of ale.

2nd Race: 120 yards three-legged race.—Prizes: 1st (worth a guinea), 1 box pills; 2nd, 1 2-lb. jar of jam; 3rd, nothing.

3rd Race: Cigarette Race.—Prizes: Wait and see.

4th Race: Tug-of-War Race.—Prize of 5s. to be spent in cigars and handed round. No competitor to weigh more than 20 stone.

- 5th Race: Throwing the Cricket Ball.—Any competitor throwing it more than 500 yards will have the pleasure of fetching it.
- 4.15.—Swimming Sports. Any competitor found smoking under water will be disqualified.
- 5.—Tea. Menu.—Cold boiled ham; salad; bread and butter; cake. *Please bring your own sugar and one coupon.*
- 5.30 to 7.—Speeches. By which time we all hope to be speechless.
- 7.15.—Char-à-banc leaves George in the Tree, also any one else who would like to be left there.
- 10.—Arrive G.P.O., New Street. Any gentleman who thinks he will require a cab home, please give notice to the committee NOT LATER than Friday, June 28th.

In the report of the Aircraft Workers' Sports in our last issue, unfortunately the printer let a couple of errors creep in. General Sir Bindon Blood is, of course, G.C.B., while Mr. Reginald Delpech, who directs the destinies of the Triplex Safety Glass Co., Ltd., with such consummate skill, spells his name as it is now printed.

CONGRATULATIONS to Mr. Basil Johnson, who has been appointed by the board of directors of Rolls-Royce, Ltd., to be general manager of the company.

It was a good idea of those who organised the annual outing of Arnott and Harrison, Ltd., to arrange for a trip up the river from Richmond to Chertsey. Fortunately on Saturday last the weather, which at first seemed to be in a capricious mood, stabilised into a glorious day, and the party, some 170 strong, who indulged in a well-earned and welcome relaxation, had a most enjoyable time. Everything down to the smallest item for the comfort and enjoyment of their employees had been thought of by the heads of the firm, so that if any present did not enjoy themselves to the full it was entirely their own fault. During the journey homeward the party were entertained quite unexpectedly by some excellent flying. A "perfect" day came to a conclusion at close upon nine o'clock.

AMONG those who, recognising the advantage of laminated wood construction, have been tackling its problems seriously, is the Robert Temple Manufacturing Co., Ltd., of Brewhouse Lane, Putney Bridge Road, S.W. 15. Mr. Temple has for many years been experimenting with various arrangements of laminated timber, and by bending the fibre of the timber in the direction of the load, without the use of steam or heat, claims to have produced a material that is far stronger than metal, weight for weight. He writes that a recent test showed that a parachute component made on this system was three times as strong as an aluminium component, weight for weight, which it has replaced. The process, we understand, does not require skilled labour, and to a large extent it can be satisfactorily carried out by female labour. It is also economical, as only the actual amount of material required is used, the work being moulded to shape. This is an important consideration, bearing in mind that the old methods entail 50 to 70 per cent. waste, owing to having to be cut to shape. The process should not be confused with others used for hollow spars, &c., as the Temple Co.'s work embraces practically any shape or form that can be planned out.

WITH further reference to the note in our last issue regarding the new development of the Aircraft Construction Co. in opening offices at Africa House, 44-46, Leadenhall Street, E.C., the Company have the advantage of the assistance there of Mr. Ransley S. Thacker, who for the last two or three years has been actively engaged in the actual manufacture of aircraft parts, tools, &c. The Company have now developed special facilities for producing small tools, and any enquiries of this nature and for A.G.S. parts and aircraft components in general will be promptly handled.

PUBLICATIONS RECEIVED.

Painting by Immersion and by Compressed Air. By A. Seymour-Jennings, F.I.B.D. London: Offices of *The Managing Editor*, 93-94, Chancery Lane, W.C. 2. Price, 10s. 6d. net.

The British Italian Commercial Association. London: 5, Victoria Street, S.W.

Tables of British Decimal Coinage: Metric and British Weights and Measures. By A. J. Lawson, M.Inst.C.E. London: Eyre and Spottiswoode, Ltd. Price 5s. net.

Short Flights with the Cloud Cavalry. By "Spin." London: Hodder and Stoughton. Price 5s. net.

Outwitting the Hun: My Escape from a German Prison Camp. By Lieut. Pat O'Brien, R.F.C. London: William Heinemann. Price 6s. net.

NEW COMPANIES REGISTERED.

AIRCRAFT PRESS, LTD., 69, Bishopsgate, E.C.—Capital, £2,500, in 10s. shares. To acquire the publication known as *Aircraft*. Governing Director for life:—H. J. Stephens, Editor.

REDCLIFFE AIRCRAFT CO., LTD., Harford Street, Cathay, Bristol.—Capital £5,000 in £1 shares. Manufacturers of wings and parts for aeroplanes, &c. First directors:—A. E. Newth, H. G. Newth, S. J. Fildes, G. H. J. Osborne, H. W. Osborne, and J. S. Salter.

SAUNDEVAN, LTD., 45-46, Chandos Street, W.C.—Capital £1,000, in £1 shares. Manufacturers of fireproofing solutions for fabrics and fireproof shields for the protection of airmen, &c. First directors: W. Saunders and E. H. Riches.

T. H. M. MANUFACTURING CO., LTD., 11, Rosmont Road, Hampstead, N.W. 3.—Capital £2,000 in £1 shares. Manufacturers of, and dealers in aerial conveyances, and component parts thereof, motor cars, &c. First directors: B. N. Taylor, F. C. Hayter and H. S. Hallett.

WATERER'S, LTD., 265, Strand, W.C.—Capital £330, in £1 shares (300 "A" and 30 "B"). Manufacturers of and dealers in swords, aeroplane parts, &c. First directors: W. J. Waterer and the Robert Banking Co., Ltd.

Aeronautical Patents Published.

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

Applied for in 1916.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published June 27th, 1918.

16,806. F. SAGE AND CO., and N. A. T. N. FEARY. Inclination indicators. (116,108.)

Published July 4, 1918.

17,804. T. O. PERRY. Aircraft for mechanical flight and automatic soaring (116,301.)

Applied for in 1917.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published June 27th, 1918.

7,834. A. H. BAILY. Engine power-transmission for aircraft. (116,149.)

8,367. W. TAYLOR. Levels for aircraft. (116,166.)

11,457. SOC. LORRAINE DIETRICH ET CIE. Ignition apparatus for aviation-engines. (109,438.)

Published July 4th, 1918.

8,061. W. F. WILLIAMS. Aeroplanes. (116,338.)

8,396. C. L. and A. H. D. PASHLEY. Landing indicating-devices for aeroplanes, &c. (116,363.)

8,398. R. H. RITCHIE. Balancing arrangements for aircraft. (116,364.)

17,593. C. H. O'ROURKE. Aeroplanes. (116,460.)

17,835. A. SCHMUKER. Sectional interlocking aeroplane propeller. (116,463.)

Applied for in 1918.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published July 4th, 1918.

116. J. H. LINDBERG. Course-indicators. (112,621.)

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